P2219,1889. 1889

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H. W. Grant.

THE BRITISH JOURNAL

PHOTOGRAPHIC ALMANAC

AND

Photographer's Daily Companion

FOR

1889.

EDITED BY J. TRAILL TAYLOR.

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PREFACE.

An opinion having been expressed that it would prove advantageous if a portion, however small, of this Annual were left blank to suit the exigencies of those desirous of making notes or memoranda, that side of the Calendar pages formerly devoted to recording the dates of the Meetings of Societies has this year been left blark. There was, however, a necessity for doing so, for during the past year the number of Photographic Societies has been so greatly increased as to render it impossible to insert in the Calendar the meetings of these various Associations unless much more space than that at command were devoted to it.

The number of contributed articles this year is greatly in excess of former years, and I have only to thank the numerous talented writers by whose aid I am enabled to present a feast not more wonderful for its variety than valuable for its riches.

J. Traill Taylor,

Editor.

2 York Street, Covent Garden, W.C.

December 1, 1888.

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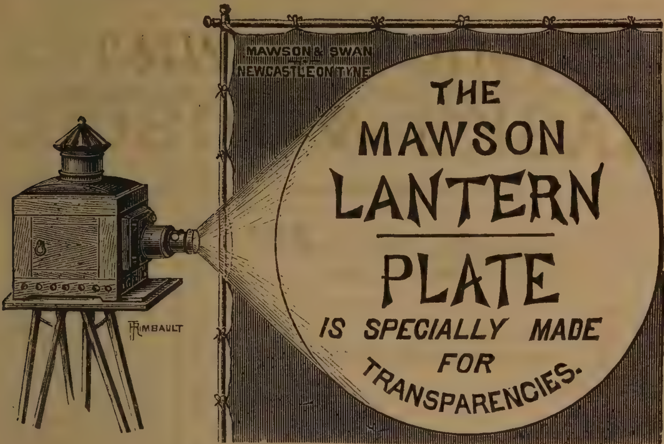

The Mawson Lantern Plate

Is specially manufactured for the production of Transparencies. There is nothing to equal it for this work. The Tones can be varied according to Developer used, and for Brilliancy and Clear=ness in Shadows it is unsurpassed.

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AND

MOSLEY STREET, NEWCASTLE-ON-TYNE.

[*See pages* 299, 301, 303, 869, 871, 877, *and* 879.

JANUARY.

D. M.	D. W.	REMARKABLE EVENTS.	SUN. Rises. H. M.	SUN. Sets. H. M.	MOON. Rises. Morn.	MOON. Sets. After.
1	Tu	● 9.8 A.	8 9	3 59	7 33	3 46
2	W	*Photographisches Archiv* f. 1860	8 9	4 0	8 37	4 52
3	Th	Prof. J. W. Draper d. 1882	8 8	4 1	9 28	6 6
4	F		8 8	4 2	10 7	7 23
5	S		8 8	4 3	10 38	8 39
6	S	Epiphany.	8 8	4 5	11 2	9 53
7	M	Daguerreotype com. to A. of Sc. 1839	8 7	4 6	11 23	11 5
8	Tu		8 7	4 7	11 42	Morn
9	W	☽ 0.41 M.	8 6	4 8	After	0 14
10	Th		8 6	4 10	0 21	1 19
11	F		8 5	4 11	0 42	2 25
12	S		8 4	4 13	1 6	3 30
13	S	1st Sunday after Epiphany	8 4	4 14	1 34	4 34
14	M	*Liverpool Photo. Journal* f. 1854	8 3	4 16	2 10	5 36
15	Tu	G. W. Simpson d. 1880	8 2	4 17	2 53	6 33
16	W		8 1	4 19	3 44	7 25
17	Th	○ 5.37 M.	8 0	4 20	4 44	8 10
18	F	E. Lacan d. 1879. Reglander d. 1875	7 59	4 22	5 49	8 48
19	S	Regnault d. 1878 [London f. 1853	7 58	4 24	6 59	9 18
20	S	2nd S. after Epiph. Photo. Soc. of	7 57	4 25	8 11	9 44
21	M	Fox Talbot b. 1800	7 56	4 27	9 25	10 7
22	Tu	Sir W. Newton d. 1869. Mr. Burgess	7 55	4 29	10 40	10 29
23	W	[d. 1873	7 54	4 30	11 57	10 50
24	Th	☾ 3.57 A.	7 53	4 32	Morn	11 12
25	F		7 51	4 34	1 15	11 36
26	S		7 50	4 36	2 34	After
27	S	3rd Sunday after Epiphany.	7 49	4 37	3 54	0 43
28	M	Photo-sculpture pat. by Willème,'63	7 47	4 39	5 10	1 30
29	Tu		7 46	4 41	6 18	2 29
30	W	Fox Talbot's first c. to Roy. Soc. 1839	7 45	4 43	7 14	3 38
31	Th	● 9.10 M.	7 43	4 44	7 59	4 54

JANUARY.

D. M.	D. W.	MEMORANDA.
1	Tu	
2	W	
3	Th	
4	F	
5	S	
6	S	
7	M	
8	Tu	
9	W	
10	Th	
11	F	
12	S	
13	S	
14	M	
15	Tu	
16	W	
17	Th	
18	F	
19	S	
20	S	
21	M	
22	Tu	
23	W	
24	Th	
25	F	
26	S	
27	S	
28	M	
29	Tu	
30	W	
31	Th	

For Meetings of Societies, *see pp.* 330–346.

FEBRUARY.

D. M.	D. W.	Remarkable Events.	SUN. Rises. H. M.	SUN. Sets. H. M.	MOON. Rises. Morn.	MOON. Sets. After.
1	F		7 41	4 47	8 34	6 12
2	S		7 39	4 49	9 1	7 29
3	S	4th Sunday after Epiphany.	7 38	4 51	9 24	8 43
4	M		7 36	4 53	9 45	9 55
5	Tu	W. D. Sanderson d. 1885	7 34	4 54	10 5	11 4
6	W		7 33	4 56	10 24	Morn
7	Th	☽ 8.58 A.	7 31	4 58	10 45	0 11
8	F	Calotype Process pat. 1841	7 29	5 0	11 8	1 17
9	S		7 27	5 2	11 34	2 22
10	S	5th Sunday after Epiphany. Sir	7 26	5 4	After	3 25
11	M	[David Brewster d. 1868	7 24	5 6	0 47	4 24
12	Tu		7 22	5 7	1 35	5 18
13	W	Leon Foncault d. 1868	7 20	5 9	2 31	6 5
14	Th	St. Valentine	7 18	5 11	3 35	6 45
15	F	Oliver Sarony b. 1820 ○ 10.17 A.	7 16	5 13	4 45	7 19
16	S	Glasgow Photo. Society f. 1860	7 14	5 15	5 58	7 47
17	S	Septuagesima Sunday.	7 12	5 17	7 13	8 12
18	M	Moule's Photogen (artificial light for	7 10	5 18	8 29	8 34
19	Tu	[portraiture) pat. 1857	7 8	5 20	9 46	8 55
20	W	Poitevin's p. of Helioplastie pub. '55	7 6	5 22	11 4	9 17
21	Th	Bingham d. 1870	7 4	5 24	Morn	9 41
22	F	☾ 11.55 A.	7 2	5 26	0 23	10 8
23	S		7 0	5 27	1 42	10 42
24	S	Sexagesima Sunday.	6 58	5 29	2 58	11 24
25	M		6 56	5 31	4 7	After
26	Tu	Senefelder d. '34. Padre Secchi d. '76	6 54	5 33	5 6	1 20
27	W	[Arago b. 1786.	6 52	5 34	5 54	2 32
28	Th		6 49	5 36	6 31	3 48

FEBRUARY.

D. M.	D. W.	MEMORANDA.
1	F	*For* MEETINGS OF SOCIETIES, *see pp.* 330–346.
2	S	
3	S	
4	M	
5	Tu	
6	W	
7	Th	
8	F	
9	S	
10	S	
11	M	
12	Tu	
13	W	
14	Th	
15	F	
16	S	
17	S	
18	M	
19	Tu	
20	W	
21	Th	
22	F	
23	S	
24	S	
25	M	
26	Tu	
27	W	
28	Th	

MARCH.

D. M.	D. W.	Remarkable Events.		Sun. Rises. H. M.	Sun. Sets. H. M.	Moon. Rises. Morn.	Moon. Sets. After.
1	F		● 10.1 A.	6 48	5 37	7 1	5 5
2	S			6 46	5 39	7 26	6 21
3	S	Quinquagesima Sunday.		6 44	5 41	7 47	7 35
4	M	Poitevin d. 1882		6 42	5 42	8 7	8 46
5	Tu	La Place d. 1827. J. Albert b. 1825		6 40	5 44	8 27	9 55
6	W	Fraunhofer b. 1787		6 37	5 46	8 47	11 2
7	Th	J. N. Niepce b. 1765. Herschel b.		6 35	5 48	9 9	Morn
8	F	[1792		6 33	5 49	9 34	0 8
9	S		☽ 5.59 A.	6 31	5 51	10 4	1 12
10	S	1st Sunday in Lent.		6 28	5 53	10 40	2 13
11	M	St. Claire Deville b. 1818		6 26	5 55	11 24	3 9
12	Tu			6 24	5 56	After	3 59
13	W			6 22	5 58	1 18	4 42
14	Th	Herschel int. hypo for fixing, 1839		6 19	6 0	2 25	5 18
15	F	F. A. Wenderoth d. 1884		6 17	6 2	3 37	5 48
16	S			6 15	6 3	4 53	6 14
17	S	2nd Sunday in Lent.	○ 11.48 M.	6 13	6 5	6 11	6 37
18	M			6 10	6 7	7 29	6 59
19	Tu	Thos. Sutton d. 1875		6 8	6 8	8 49	7 20
20	W			6 6	6 10	10 10	7 43
21	Th	Bingham d. 1870		6 4	6 12	11 31	8 10
22	F			6 1	6 13	Morn	8 42
23	S		[☾ 6.54 M.	5 59	6 15	0 50	9 21
24	S	3rd S. in Lent. Becquerel b. 1820		5 57	6 17	2 2	10 10
25	M	Hermagis d. 1868		5 54	6 18	3 3	11 9
26	Tu			5 52	6 20	3 53	After
27	W			5 50	6 22	4 33	1 32
28	Th	La Place b. 1749		5 47	6 23	5 5	2 48
29	F			5 45	6 25	5 30	4 3
30	S	Balard d. 1876	[● 11.37 M.	5 43	6 27	5 51	5 17
31	S	4th Sun. in Lent. Bunsen b. 1811		5 41	6 28	6 11	6 28

MARCH.

D. M.	D. W.	MEMORANDA.
1	F	*For* Meetings of Societies, *see pp.* 330–346.
2	S	
3	S	
4	M	
5	Tu	
6	W	
7	Th	
8	F	
9	S	
10	S	
11	M	
12	Tu	
13	W	
14	Th	
15	F	
16	S	
17	S	
18	M	
19	Tu	
20	W	
21	Th	
22	F	
23	S	
24	S	
25	M	
26	Tu	
27	W	
28	Th	
29	F	
30	S	
31	S	

APRIL.

D. M.	D. W.	Remarkable Events.	Sun Rises. H. M.	Sun Sets. H. M.	Moon Rises. Morn.	Moon Sets. After.
1	M	['45. Morse d. '72.	5 38	6 30	6 30	7 38
2	Tu	First Sun Photo. by Tizeau & Foucalt,	5 36	6 32	6 49	8 47
3	W		5 34	6 33	7 10	9 54
4	Th	[b. 1795	5 32	6 35	7 34	11 0
5	F	Rev. J. B. Reade b. '01. Isidore Niepce	5 29	6 37	8 2	Morn
6	S	[Nièpce de St. Victor d. 1870.	5 27	6 38	8 36	0 3
7	S	5th S. in Lent. Voightlander d. '78.	5 25	6 40	9 16	1 1
8	M	☽ 1.47 A.	5 23	6 41	10 4	1 53
9	Tu	Fox Talbot's First Art. in *Athenæum*	5 20	6 43	11 0	2 38
10	W	Pouncy's Carbon Process pat. 1858	5 18	6 45	After	3 16
11	Th	Nottage d. 1885	5 16	6 46	1 15	3 48
12	F	T. R. Williams d. 1871	5 14	6 48	2 28	4 15
13	S		5 12	6 50	3 44	4 38
14	S	Palm Sunday.	5 9	6 52	5 3	5 0
15	M	○ 10.19 A.	5 7	6 53	6 24	5 22
16	Tu		5 5	6 55	7 47	5 45
17	W	Fargier's Carbon Process pat. 1861	5 3	6 57	9 12	6 10
18	Th		5 1	6 58	10 35	6 40
19	F	Abbé Moigno b. 1804	4 59	7 0	11 52	7 17
20	S	J. A. Spencer d. 1878 [cess pat. '58	4 57	7 2	Morn	8 4
21	S	Easter S. Talbot's Photo.-etch. Pro-	4 54	7 3	1 0	9 1
22	M	Rev. F. F. Statham d. 1884 ☾ 1.56 A.	4 52	7 5	1 55	10 8
23	Tu		4 50	7 6	2 37	11 22
24	W	Celsius d. 1744	4 48	7 8	3 10	After
25	Th	'Sun-blinds' pat. 1862	4 46	7 10	3 36	1 51
26	F	Adam Salomon d. 1881	4 44	7 11	3 58	3 4
27	S	Morse b. 1791	4 42	7 13	4 18	4 15
28	S	Low Sunday. Böttger b. 1806	4 40	7 15	4 36	5 25
29	M	Dixon's Iodide Emul. Pro. pat. '61.	4 38	7 16	4 54	6 34
30	Tu	● 2.5 M. [Böttger d. '81.	4 36	7 18	5 14	7 42

APRIL.

D. M.	D. W.	MEMORANDA.
1	M	
2	Tu	For Meetings of Societies, see pp. 330–346.
3	W	
4	Th	
5	F	
6	S	
7	S	
8	M	
9	Tu	
10	W	
11	Th	
12	F	
13	S	
14	S	
15	M	
16	Tu	
17	W	
18	Th	
19	F	
20	S	
21	S	
22	M	
23	Tu	
24	W	
25	Th	
26	F	
27	S	
28	S	
29	M	
30	Tu	

MAY.

D. M.	D. W.	Remarkable Events.		Sun Rises H. M.	Sun Sets H. M.	Moon Rises Morn.	Moon Sets After.
1	W			4 35	7 20	5 36	8 49
2	Th			4 33	7 21	6 2	9 53
3	F			4 31	7 23	6 33	10 53
4	S	Senebier b. 1742	[b. 1811	4 29	7 24	7 10	11 48
5	S	2nd Sun. af. Easter. J. W. Draper		4 27	7 26	7 55	Morn
6	M	Humboldt d. 1859		4 25	7 28	8 49	0 36
7	Tu	Fortier d. 1882	☽ 6.43 M.	4 24	7 29	9 50	1 16
8	W	Peroxide of H. rec. for rem. of Hypo,'66		4 22	7 31	10 56	1 49
9	Th	Guy Lussac d. 1850		4 20	7 32	After	2 17
10	F	South London Photo. Soc. f. 1859		4 18	7 34	1 20	2 41
11	S	H. Baden Pritchard d. 1884	[d. '71	4 17	7 36	2 36	3 3
12	S	3rd S. af. Easter. Sir John Herschel		4 15	7 37	3 55	3 24
13	M	Justus von Liebig b. 1803		4 14	7 39	5 16	3 45
14	Tu	Fahrenheit b. 1686		4 12	7 40	6 41	4 8
15	W		○ 6.42 M.	4 11	7 42	8 7	4 35
16	Th	C. Breese d. 1875. C. Russell d. 1887		4 9	7 43	9 31	5 9
17	F	Belgian Photo. Association f. 1874		4 8	7 45	10 46	5 53
18	S			4 6	7 46	11 49	6 48
19	S	4th Sunday after Easter.		4 5	7 47	Morn	7 54
20	M			4 4	7 49	0 37	9 8
21	Tu	Scheele d. 1786	☾ 9.53 A.	4 2	7 50	1 13	10 25
22	W			4 1	7 52	1 42	11 41
23	Th	J. W. Gough d. 1878		4 0	7 53	2 6	After
24	F			3 59	7 54	2 26	2 6
25	S	T. J. Pearsall d. 1883		3 58	7 56	2 44	3 16
26	S	Rogation Sunday.		3 56	7 57	3 2	4 25
27	M			3 55	7 58	3 21	5 32
28	Tu			3 54	7 59	3 41	6 39
29	W	Sir H. Davy d. 1829	● 5.20 A.	3 53	8 1	4 5	7 45
30	Th	J. Sidebotham d. 1885		3 52	8 2	4 34	8 47
31	F			3 52	8 3	5 9	9 44

MAY.

D. M.	D. W.	MEMORANDA.
1	W	*For* MEETINGS OF SOCIETIES, *see pp.* 330–346.
2	Th	
3	F	
4	S	
5	S	
6	M	
7	Tu	
8	W	
9	Th	
10	F	
11	S	
12	S	
13	M	
14	Tu	
15	W	
16	Th	
17	F	
18	S	
19	S	
20	M	
21	Tu	
22	W	
23	Th	
24	F	
25	S	
26	S	
27	M	
28	Tu	
29	W	
30	Th	
31	F	

JUNE.

D. M.	D. W.	Remarkable Events.	Sun. Rises. H. M.	Sun. Sets. H. M.	Moon. Rises. Morn.	Moon. Sets. After.
1	S	Imp. in Calotype pat.	3 51	8 4	5 51	10 34
2	S	Sun. af. Ascension. Niepce pubsh.	3 50	8 5	6 42	11 17
3	M	[his *Heliochromic Processes*, '51	3 49	8 6	7 39	11 52
4	Tu	Tessié du Mothay d. 1880	3 49	8 7	8 43	Morn
5	W		3 48	8 8	9 51	0 21
6	Th	Fordos d. 1878 ☽ 8.2 A.	3 47	8 9	11 1	0 45
7	F	Fraunhofer d. 1826	3 47	8 10	After	1 7
8	S		3 46	8 11	1 29	1 27
9	S	Whit Sunday.—Pentecost Con-	3 46	8 12	2 47	1 47
10	M	[stant Delessert d. 1876	3 45	8 13	4 9	2 8
11	Tu	Cutting's American Bromide pat. '53	3 45	8 13	5 34	2 33
12	W		3 45	8 14	6 59	3 3
13	Th	○ 1.58 A.	3 45	8 15	8 21	3 41
14	F	Partnership between Daguerre and	3 44	8 15	9 32	4 30
15	S	[Niepce, 1837	3 44	8 16	10 29	5 32
16	S	Trinity S. Chrysotype and Cyano-	3 44	8 16	11 12	6 45
17	M	[type Processes com. to Roy. Soc.	3 44	8 17	11 45	8 5
18	Tu	O. G. Rejlander d. 1875	3 44	8 17	Morn	9 24
19	W	Abbe Laborde d. 1883	3 44	8 18	0 11	10 41
20	Th	☾ 7.35 M.	3 44	8 18	0 32	11 55
21	F	Niepce Memorial uncovered at Cha-	3 44	8 18	0 51	After
22	S	[lons, 1885. Dr. Diamond d. 1886	3 45	8 19	1 9	2 15
23	S	1st Sunday after Trinity.	3 45	8 19	1 28	3 23
24	M		3 45	8 19	1 48	4 30
25	Tu	[b. 1839	3 45	8 19	2 10	5 35
26	W	W. B. Woodbury b. 1834. Liesegang	3 46	8 19	2 37	6 38
27	Th	Herr Wothly d. '73. G. Price d. '70	3 46	8 19	3 9	7 37
28	F	● 8.54 M.	3 47	8 19	3 49	8 31
29	S	Ferrous-oxalate Develop. [pub. 1877	3 47	8 19	4 37	9 17
30	S	2nd Sunday after Trinity. Frank	3 48	8 18	5 33	9 55
		[Howard d. 1866				

JUNE.

D. M.	D. W.	MEMORANDA.
1	S	
2	S	*For* MEETINGS OF SOCIETIES, *see pp.* 330–346.
3	M	
4	Tu	
5	W	
6	Th	
7	F	
8	S	
9	S	
10	M	
11	Tu	
12	W	
13	Th	
14	F	
15	S	
16	S	
17	M	
18	Tu	
19	W	
20	Th	
21	F	
22	S	
23	S	
24	M	
25	Tu	
26	W	
27	Th	
28	F	
29	S	
30	S	

JULY.

D. M.	D. W.	Remarkable Events.	Sun Rises H. M.		Sun Sets H. M.		Moon Rises Morn.		Moon Sets After.	
1	M		3	49	8	18	6	35	10	26
2	Tu		3	49	8	18	7	42	10	51
3	W		3	50	8	18	8	51	11	13
4	Th	Philip Remele d. 1883	3	51	8	17	10	1	11	33
5	F	J. Nicephore Niepce d. 1833	3	51	8	17	11	13	11	52
6	S	Rev. W. J. Whiting d. 1885 ☽ 5.59 M.	3	52	8	16	After		Morn	
7	S	3rd Sunday after Trinity. Dr.	3	53	8	16	1	46	0	12
8	M	[Schnauss b. 1827	3	54	8	15	3	6	0	34
9	Tu		3	55	8	14	4	29	1	0
10	W	Daguerre d. 1851	3	56	8	14	5	52	1	32
11	Th		3	57	8	13	7	8	2	14
12	F	Wedgwood b. 1730 ○ 9.2 A.	3	58	8	12	8	13	3	10
13	S	Abbé Moigno d. 1884	3	59	8	11	9	4	4	18
14	S	4th Sunday after Trinity. Dumas	4	0	8	10	9	42	5	36
15	M	[b. 1800	4	2	8	9	10	12	6	58
16	Tu	Claudet b. 1797	4	3	8	8	10	36	8	19
17	W		4	4	8	7	10	56	9	37
18	Th	V. M. Griswold (Inv. Ferrotype) d.'72	4	5	8	6	11	15	10	51
19	F	☾ 7.45 A.	4	6	8	5	11	33	After	
20	S	Collodion Pos. Process pub. 1852	4	8	8	4	11	53	1	12
21	S	5th Sunday af. Trinity. Regnault	4	9	8	3	Morn		2	20
22	M	Bessel b. 1784 [b. 1810	4	10	8	2	0	15	3	27
23	Tu		4	12	8	1	0	40	4	31
24	W	Captain Abney b. 1843	4	13	7	59	1	10	5	32
25	Th		4	15	7	58	1	47	6	27
26	F	Nièpce de St. Victor b. 1806	4	16	7	57	2	32	7	15
27	S		4	17	7	55	3	26	7	55
28	S	6th Sunday after Trinity ● 0.1 M.	4	19	7	54	4	27	8	29
29	M	Secchi b. 1818	4	20	7	52	5	33	8	56
30	Tu		4	22	7	51	6	42	9	19
31	W	Wohler b. 1800	4	23	7	49	7	53	9	40

JULY.

D. M.	D. W.	MEMORANDA.
1	M	*For* Meetings of Societies, *see pp.* 330-346.
2	Tu	
3	W	
4	Th	
5	F	
6	S	
7	S	
8	M	
9	Tu	
10	W	
11	Th	
12	F	
13	S	
14	S	
15	M	
16	Tu	
17	W	
18	Th	
19	F	
20	S	
21	S	
22	M	
23	Tu	
24	W	
25	Th	
26	F	
27	S	
28	S	
29	M	
30	Tu	
31	W	

AUGUST.

D. M.	D. W.	REMARKABLE EVENTS.	SUN. Rises. H. M.	SUN. Sets. H. M.	MOON. Rises. Morn.	MOON. Sets. After.
1	Th		4 25	7 48	9 5	9 59
2	F	Stromeyer b. 1776	4 26	7 46	10 17	10 18
3	S	Mungo Ponton d. 1880	4 28	7 44	11 31	10 38
4	S	7th Sunday after Trinity) 1.27 A.	4 29	7 43	After	11 1
5	M	Wollaston b. 1766	4 31	7 41	2 9	11 30
6	Tu	Rose b. 1795	4 32	7 39	3 30	Morn
7	W	Berzelius d. 1848	4 34	7 37	4 47	0 6
8	Th	Roger Fenton d. 1869	4 35	7 36	5 55	0 53
9	F		4 37	7 34	6 52	1 54
10	S	Jabez Hughes d. 1884 O 4.43 M.	4 38	7 32	7 36	3 8
11	S	8th S. af. Trin. E. A. Hadow d. '66	4 40	7 30	8 9	4 28
12	M	J. H. Fitzgibbon d. 1882	4 42	7 28	8 36	5 51
13	Tu	Prof. Stokes b. 1819	4 43	7 26	8 58	7 12
14	W	Daguerreotype Proc. pat. '39	4 45	7 24	9 18	8 30
15	Th		4 46	7 22	9 37	9 45
16	F	Lavoisier b. 1743	4 48	7 20	9 56	10 57
17	S		4 49	7 18	10 17	After
18	S	9th Sun. af. Trin. Dr. Woodward	4 51	7 16	10 41	1 15
19	M	[(photo-microscopist) d. '84 (10.52 M.	4 53	7 14	11 10	2 21
20	Tu	Prof. Tyndall b. 1820	4 54	7 12	11 45	3 24
21	W	Chevreul b. 1786	4 56	7 10	Morn	4 21
22	Th	Sir Frederick Pollock d. 1870	4 57	7 8	0 27	5 11
23	F		4 59	7 7	1 17	5 54
24	S	Cutting (Introd. of Ambrotype) d. '67	5 1	7 4	2 16	6 30
25	S	10th S. af. Trin. Faraday d. 1867	5 2	7 2	3 21	6 59
26	M	Paul Pretsch d. '73. Daguerre Me-	5 4	7 0	4 30	7 24
27	Tu	[morial uncovered, '83 ● 2.0 A.	5 5	6 58	5 41	7 45
28	W		5 7	6 55	6 54	8 5
29	Th	Varrentrapp b. 1815	5 9	6 53	8 8	8 24
30	F	Oliver Sarony d. 1879	5 10	6 51	9 23	8 43
31	S	Helmholtz b. 1821	5 12	6 48	10 40	9 5

AUGUST.

D. M.	D. W.	MEMORANDA.
1	Th	*For* MEETINGS OF SOCIETIES, *see pp.* 330–346.
2	F	
3	S	
4	S	
5	M	
6	Tu	
7	W	
8	Th	
9	F	
10	S	
11	S	
12	M	
13	Tu	
14	W	
15	Th	
16	F	
17	S	
18	S	
19	M	
20	Tu	
21	W	
22	Th	
23	F	
24	S	
25	S	
26	M	
27	Tu	
28	W	
29	Th	
30	F	
31	S	

SEPTEMBER.

D. M.	D. W.	Remarkable Events.	Sun. Rises. H. M.	Sun. Sets. H. M.	Moon. Rises. Morn.	Moon. Sets. After.
1	S	11th S. af. Trin. Norris's Dry-plate	5 13	6 47	11 58	9 31
2	M	W. Blair drwn. '71 ☾ 7.35 A. [Pro. pat. '56	5 15	6 45	After	10 4
3	Tu		5 17	6 42	2 34	10 46
4	W	Woodbury d. 1885	5 18	6 40	3 44	11 40
5	Th	Pantascope Camera pat. 1862	5 20	6 38	4 43	Morn
6	F		5 21	6 36	5 30	0 47
7	S	Poitevin Memorial inaugurated, 1885	5 23	6 33	6 7	2 8
8	S	12th Sunday after Trinity	5 24	6 31	6 36	3 24
9	M	Collodio bromide Process pub. 1864	5 26	6 29	7 0	4 45
10	Tu	[○ 1.53 A.	5 28	6 26	7 20	6 5
11	W		5 29	6 24	7 39	7 22
12	Th		5 31	6 22	7 58	8 37
13	F		5 33	6 20	8 19	9 49
14	S	Humboldt b. 1769	5 34	6 17	8 42	10 59
15	S	13th Sun. af. Trin. [d. 1869	5 36	6 15	9 8	After
16	M	J. L. Gihon d. 1878. Prof. Graham	5 37	6 13	9 40	1 12
17	Tu	Fox Talbot d. 1877 ☾ 4.49 M.	5 39	6 10	10 19	2 12
18	W	Leon Foucalt b. 1819	5 40	6 8	11 7	3 6
19	Th	T. Grubb d. 1878 [Wilde d. '83	5 42	6 6	Morn	3 52
20	F	Talbot's Disc. of Develop. '40. F. A.	5 44	6 3	0 3	4 30
21	S	Stas b. 1813 [Thos. Sutton b. '19	5 45	6 1	1 6	5 1
22	S	14th S. af. Trin. Faraday b. 1791.	5 47	5 59	2 14	5 27
23	M	Woodbury Pro. p. '64	5 49	5 56	3 25	5 49
24	Tu	J. G. Tunny d. 1887	5 50	5 54	4 38	6 10
25	W	Dr. Van Monckhoven b. 1834, d. '82	5 52	5 52	5 53	6 30
26	Th	[● 2.42 M.	5 53	5 50	7 9	6 49
27	F	Kolbe b. 1818	5 55	5 47	8 27	7 10
28	S	H. Negretti d. 1879 [of Iodine) d. '38	5 57	5 45	9 47	7 34
29	S	15th S. af. Trin. Courtois (Discoverer	5 58	5 43	11 7	8 4
30	M	Balard (Discoverer of Bromine) b. '02	6 0	5 40	After	8 43

SEPTEMBER.

D. M.	D. W.	MEMORANDA.
1	S	
2	M	*For* Meetings of Societies, *see pp.* 330–346.
3	Tu	
4	W	
5	Th	
6	F	
7	S	
8	S	
9	M	
10	Tu	
11	W	
12	Th	
13	F	
14	S	
15	S	
16	M	
17	Tu	
18	W	
19	Th	
20	F	
21	S	
22	S	
23	M	
24	Tu	
25	W	
26	Th	
27	F	
28	S	
29	S	
30	M	

OCTOBER.

D. M.	D. W.	Remarkable Events.		SUN. Rises. H. M.	SUN. Sets. H. M.	MOON. Rises. After.	MOON. Sets. After.
1	Tu			6 2	5 38	1 38	9 33
2	W	Arago d. 1853	☽ 1.33 M.	6 3	5 36	2 40	10 35
3	Th			6 5	5 34	3 30	11 47
4	F			6 7	5 31	4 8	Morn
5	S			6 8	5 29	4 38	1 6
6	S	16th Sunday after Trinity		6 10	5 27	5 3	2 26
7	M			6 12	5 25	5 24	3 44
8	Tu	Fr. Bollman d. 1863		6 13	5 22	5 42	5 1
9	W		○ 1.26 M.	6 15	5 20	6 1	6 16
10	Th			6 17	5 18	6 21	7 29
11	F	H. T. Anthony d. 1884		6 18	5 16	6 42	8 41
12	S	Gmelin b. 1792		6 20	5 13	7 6	9 52
13	S	17th Sunday after Trinity		6 22	5 11	7 36	11 0
14	M			6 23	5 9	8 13	After
15	Tu	Kaulback b. 1805		6 25	5 7	8 57	0 59
16	W		☾ 0.38 M.	6 27	5 5	9 49	1 48
17	Th	Reaumur d. 1757. Robert Hunt d. '87		6 29	5 3	10 49	2 29
18	F	Schonbein b. 1799. Wheatstone d. '75		6 30	5 0	11 55	3 2
19	S			6 32	4 58	Morn	3 29
20	S	18th Sunday after Trinity		6 34	4 56	1 4	3 52
21	M			6 35	4 54	2 16	4 13
22	Tu			6 37	4 52	3 30	4 32
23	W			6 39	4 50	4 46	4 51
24	Th		● 2.26 A.	6 41	4 48	6 5	5 12
25	F			6 43	4 46	7 26	5 35
26	S			6 44	4 44	8 49	6 4
27	S	19th Sunday after Trinity		6 46	4 42	10 11	6 40
28	M	Collodio-chloride of Silver pub. 1864		6 48	4 40	11 29	7 27
29	Tu	Talbot Photo-engraving Proc. pat.'52		6 50	4 38	After	8 26
30	W			6 51	4 36	1 31	9 36
31	Th	John Glover d. 1864	☽ 8.31 M.	6 53	4 35	2 12	10 53

OCTOBER.

D. M.	D. W.	MEMORANDA.
1	Tu	For Meetings of Societies, see pp. 330–346.
2	W	
3	Th	
4	F	
5	S	
6	S	
7	M	
8	Tu	
9	W	
10	Th	
11	F	
12	S	
13	S	
14	M	
15	Tu	
16	W	
17	Th	
18	F	
19	S	
20	S	
21	M	
22	Tu	
23	W	
24	Th	
25	F	
26	S	
27	S	
28	M	
29	Tu	
30	W	
31	Th	

NOVEMBER.

D. M.	D. W.	Remarkable Events.	Sun Rises. H. M.	Sun Sets. H. M.	Moon Rises. After.	Moon Sets. Morn.
1	F		6 55	4 33	2 44	Morn
2	S	W. H. Rulofson d. 1878	6 57	4 31	3 9	0 11
3	S	20th Sunday after Trinity	6 58	4 29	3 30	1 29
4	M	Mohr b. '06	7 0	4 27	3 49	2 45
5	Tu		7 2	4 25	4 7	4 0
6	W	Senefelder b. 1771	7 4	4 24	4 25	5 13
7	Th	Dubois Raymond b. 1818 ○ 4.5A.	7 6	4 22	4 45	6 25
8	F	F. Zollner b. 1834	7 7	4 20	5 8	7 36
9	S	Pretsch's Photo-engraving Proc. p.'54	7 9	4 19	5 35	8 45
10	S	21st S. af. Trin. Sil. Laroche d.'86	7 11	4 17	6 8	9 51
11	M	Willis's Aniline Process pat. 1864	7 13	4 16	6 49	10 51
12	Tu		7 14	4 14	7 38	11 44
13	W		7 16	4 13	8 34	After
14	Th		7 18	4 11	9 37	1 2
15	F	☾ 8.36A.	7 20	4 10	10 45	1 31
16	S	Lavater d. 1741	7 21	4 8	11 55	1 55
17	S	22nd S. af. Trin. C. B. Vignoles	7 23	4 7	Morn	2 16
18	M	Daguerre b. 1787 [d. 1875	7 25	4 6	1 6	2 36
19	Tu	Thorwalsden b. 1770	7 27	4 5	2 20	2 55
20	W	Prof. Draper d. 1882	7 28	4 3	3 57	3 14
21	Th		7 30	4 2	4 57	3 35
22	F	Schlippe b. 1749 [● 1.44M.	7 32	4 1	6 20	4 0
23	S	Harrison (Inv. of the Globe Lens) d.'64	7 33	4 0	7 46	4 33
24	S	23rd S. af. Trin. Prof. Silliman d.'64	7 35	3 59	9 10	5 16
25	M	J. B. Hockin d.'69. Gustav Re b.'35	7 36	3 58	10 24	6 12
26	Tu		7 38	3 57	11 26	7 21
27	W	Celsius b. 1701	7 40	3 56	After	8 38
28	Th	Sutton's Panoramic Camera pat. '59	7 41	3 55	0 49	9 58
29	F	Window d. 1875 ☽ 5.29A.	7 42	3 54	1 16	11 18
30	S		7 44	3 53	1 38	Morn

NOVEMBER.

D. M.	D. W.	MEMORANDA.
1	F	*For* MEETINGS OF SOCIETIES, *see pp.* 330-346.
2	S	
3	S	
4	M	
5	Tu	
6	W	
7	Th	
8	F	
9	S	
10	S	
11	M	
12	Tu	
13	W	
14	Th	
15	F	
16	S	
17	S	
18	M	
19	Tu	
20	W	
21	Th	
22	F	
23	S	
24	S	
25	M	
26	Tu	
27	W	
28	Th	
29	F	
30	S	

DECEMBER.

D. M.	D. W.	Remarkable Events.	Sun Rises. H. M.	Sun Sets. H. M.	Moon Rises. After.	Moon Sets. Morn.
1	S	1st Sun. in Adv. Klaproth b. 1743	7 45	3 53	1 57	0 35
2	M		7 47	3 52	2 14	1 49
3	Tu		7 48	3 52	2 32	3 2
4	W	Galvani d. 1798	7 50	3 51	2 51	4 14
5	Th	[1864. Guy Lussac b. 1778	7 51	3 51	3 12	5 24
6	F	Obernetter's Chromo-photography p.	7 52	3 50	3 36	6 33
7	S	○ 9.52 M.	7 53	3 50	4 7	7 40
8	S	2nd S. in Ad. Will (Chemist) b. '12	7 55	3 49	4 45	8 43
9	M	Scheele b. 1742. Duc de Luynes d. '67.	7 56	3 49	5 31	9 38
10	Tu	[Grasshof d. '71	7 57	3 49	6 25	10 25
11	W	Sir D. Brewster b. 1781	7 58	3 49	7 26	11 4
12	Th	Reade d. 1870	7 59	3 49	8 31	11 36
13	F	First Photo-enamel Process pat. '54	8 0	3 49	9 39	After
14	S	Barreswil b. 1817.	8 1	3 49	10 48	0 22
15	S	3rd Sunday in Advent ☾ 2.58 A.	8 2	3 49	11 59	0 41
16	M	H. Greenwood d. '84. T. Ross d. '70	8 3	3 49	Morn	0 59
17	Tu	Sir Humphry Davy b. 1778	8 3	3 49	1 12	1 17
18	W		8 4	3 49	2 28	1 36
19	Th	Mawson k. 1867	8 5	3 50	3 48	1 58
20	F	Pyrogallic Acid intro. as a Developer	8 5	3 50	5 11	2 26
21	S	[by Archer, 1851	8 6	3 51	6 36	3 3
22	S	4th Sun. in Ad. Wollaston d. 1828	8 7	3 51	7 58	3 53
23	M	[● 0.52 A.	8 7	3 52	9 9	4 57
24	Tu		8 7	3 52	10 5	6 13
25	W	Christmas Day Sir I. Newton b. 1642	8 8	3 53	10 47	7 36
26	Th		8 8	3 53	11 18	9 0
27	F	A. Claudet d. 1867	8 8	3 54	11 43	10 21
28	S	J. T. Goddard d. 1866	8 8	3 55	After	11 38
29	S	Sunday after Christmas ☽ 5.17 M.	8 9	3 56	0 22	Morn
30	M	J. H. Dallmeyer d. 1883	8 9	3 57	0 39	0 52
31	Tu	A. Braun d. 1877. C. Waldack d. 1882	8 9	3 58	0 57	2 4

DECEMBER.

D. M.	D. W.	MEMORANDA.
1	S	
2	M	*For* MEETINGS OF SOCIETIES, *see pp.* 330–346.
3	Tu	
4	W	
5	Th	
6	F	
7	S	
8	S	
9	M	
10	Tu	
11	W	
12	Th	
13	F	
14	S	
15	S	
16	M	
17	Tu	
18	W	
19	Th	
20	F	
21	S	
22	S	
23	M	
24	Tu	
25	W	
26	Th	
27	F	
28	S	
29	S	
30	M	
31	Tu	

PHOTOGRAPHIC SOCIETIES, &c.

For Society Announcements received too late for Classification **see pp. 386-7.**

Aberdeen and North of Scotland Amateur Photographic Association.—(ESTABLISHED 1885.)—The Annual Meeting is held in April in the Café Shiprow. *President*—John Milne. *Vice-President*—Robert Houston. *Council*—T. W. Binner and Alex. McKilligan. *Treasurer*—Alex. Edward, jun. *Secretary*—James Main, 8 Elmfield Avenue, Aberdeen.

Amateur Photographic Association.—(ESTABLISHED 1861.)—*President*—His Royal Highness the Prince of Wales. *Vice-Presidents*—H.S.H. The Duke of Teck, G.C.B., The Most Noble the Marquis of Drogheda, Lieut.-General the Right Hon. the Lord de Ros, The Right Hon. the Earl of Rosse, F.R.S., James Glaisher, Esq., F.R.S., F.R.A.S., &c. *Council*—Sir J. Whittaker Ellis, Bart., M.P., Sir Spencer Maryon Wilson, Bart., Walter Wood, Esq., F.R.G.S., W. D. Howard, Esq., F.I.C., Charles Stephens, Esq., M.A. (Oxon.), W. S. Hobson, Esq., John Aird, Esq., M.P. *Hon. Secretary*—Arthur James Melhuish, Esq., F.R.A.S., and F.R.Met.Soc. *Offices*—12 Old Bond Street, London, W.

Amateur Photographic Society.—(ESTABLISHED 1852.)—Monthly Outings during the summer. Indoor Meetings monthly during the winter. Annual Meeting in March. *President*—T. M. Brownrigg. *Treasurer and Secretary*—W. Wainwright, Hoe Place, Woking.

Bath Photographic Society.—(ESTABLISHED 1888.)—Ordinary Meetings held on the last Wednesday evening in each month. Frequent Outdoor Meetings during the summer months. *Provisional Committee*—Austin J. King, Philip Braham, W. Harbutt, Walter Pitt. *Hon. Secretary and Treasurer* (*pro tem.*)—W. Middleton Ashman. *Temporary Premises*—34 Gay Street, Bath.

Birmingham Photographic Society.—(ESTABLISHED 1885.)—The Society meets on the second and fourth Thursday of October, November, December, January, February, and March, and on the fourth Thursday only of the six summer months, at half-past Seven p.m., in the Society's Rooms at the Technical Schools, Bridge Street. *President*—R. H. Norris, M.D. *Vice-Presidents*—W. Septimus Harding, J.P., J. C. Huxley, E. H. Jaques. *Council*—J. J. Button, James P. Heaton, E. C. Middleton, W. J. Harrison, J. Place, G. A. Thomason, G. M. Iliffe, J. C. Fowler. *Treasurer*—Thomas Taylor. *Secretaries*—J. H. Pickard, 361 Moseley Road, and William Rooke, Ascot Road, Moseley.

Birkenhead Photographic Association.—(ESTABLISHED 1884.)—Meetings held second Thursday in each month at half-past Seven p.m. at the Free Public Library, Hamilton Street. Annual Meeting in November. *President*—Paul Lange. *Vice-President*—P. H. Phillips. *Council*—J. A. Forrest, H. H. Williams, W. P. Riley, H. Lupton, T. C. James, H. Wilkinson, T. S. Mayne, G. A. Carruthers, F. N. Eaton. *Treasurer*—F. Evans. *Secretary*—James L. Mackrell, 26 Lorne Street, Fairfield, Liverpool.

Blackburn Literary Club (Photographic Section).—(ESTABLISHED 1884.)—Each Section of the Club is managed by its own Secretary. Meetings and Excursions at intervals during the season. *President*—T. J. Syckelmoore, B.A. *Vice-President*—Charles Smithies. *Hon. Secretary*—E. S. Johnson, Literary Club, Blackburn.

Bolton Photographic Club.—(ESTABLISHED 1883.)—Meetings are held every Tuesday Evening, at the Studio of the Club, Chancery Lane, Bolton, at Eight o'clock p.m. *President*—Jabez Boothroyd. *Vice-President*—Thomas Jukes. *Committee*—Messrs. Hawksworth, Banks, Bradshaw, Ashworth, Sewell. *Treasurer*—John Bradshaw. *Secretary*—James Slater, Town Hall Square, Bolton.

Bolton Photographic Society.—(ESTABLISHED 1879.)—Ordinary Meetings held at the Baths, Bridgman Street, on the first Thursday in each month from September to May, at Eight p.m. Annual Meeting, first Thursday in October. *President*—J. R. Bridson. *Vice-Presidents*—E. N. Ashworth R. Harwood, W. Banks, Walter Knowles, Rev. J. W. Cundey, Thomas Parkinson. *Council*—J. Boothroyd, W. Laitnwaite, T. Davis, J. Leach, Charles J. P. Fuller, J. Lomax, Dr. Johnston, R. Mercer. *Hon. Treasurer*—C. K. Dalton. *Hon. Secretary*—B. H. Abbatt, 12 Corporation Street, Bolton.

Bradford Photographic Society.—(ESTABLISHED 1882.)—Meetings held at 55 North Parade, on the second Tuesday in the month, from October to June inclusive, at a quarter to Eight. Annual Meeting, October. *President*—Duncan G. Law. *Vice-Presidents*—H. Forsyth and W. H. Scott. *Committee*—J. Sonnenthal, Rev. William Aston, LL.D., B.A., M. B. Wallace, J. E. Fawcett, H. H. Tankard, Rev. T. Mellodey, George Roberts, W. Leach. *Treasurer and Secretary*—William S. Smith.

British Association for the Advancement of Science.—(ESTABLISHED 1831.)—Will meet in 1889 at Newcastle-on-Tyne, September 11. *President*—Sir F. J. Bramwell, F.R.S. *President-Elect*—Professor W. H. Flower, C.B., F.R.S. *Treasurer*—Dr. A. W. Williamson, F.R.S. *General Secretaries*—Sir D. Galton, K.C.B., and A. V. Harcourt, F.R.S. *Secretary*—A. T. Atchison, 22 Albemarle Street, London, W.

Brechin Photographic Association.—(Established 1888.)—Meets in the Mechanics' Institute on the first Wednesday of each month at a quarter past Eight p.m. *President*—William Shaw Adamson, Causton Castle. *Vice-Presidents*—Dr. Anderson and R. Adamson Scott, M.A. *Council*—W. Lyall, J. C. Middleton, D. Hodgeton, jun. *Secretary and Treasurer*—James D. Ross, 13 Park Road, Brechin, N. B.

Bristol Camera Society.—(Established 1887.)—Meetings of the Society held on the fourth Thursday in each month from April to September, and on the second and fourth Thursdays from October to March. Field Excursions, once a month from April to September. Annual Meeting, second Thursday in October. *President*—Abel Lewis. *Vice-Presidents*—Arthur Richardson, Ph.D., and J. M. Timurd. *Council*—C. Bryant, E. Harris, M. Lavington, W. W. Balcet, E. J. Smith, G. Young. *Treasurer*—Henry F. Lewis. *Secretary*—Frank Holmes, University College, Bristol.

Bristol and West of England Amateur Photographic Association.—(Established 1871.)—Meetings, third Wednesday in each month, at Queen's Hotel, Clifton, at half-past Seven p.m. Annual Meeting in January. *President*—T. Davey. *Vice-Presidents*—Colonel Playfair and H. A. H. Daniel. *Council*—W. W. Boyden, J. Phillips, W. B. Wright, and the Officers of the Association. *Treasurer and Secretary*—Edward Brightman, Lyndale, Redland Road, Bristol.

Brockley and St. John's Scientific Society.—*President*—A. E. Lamb. *Vice-Presidents*—W. J. Spratling, B.Sc., F.G.S., &c., F. J. Tayler, B.A., M.B., Jenner Weir, F.L.S., F.Z.S. *Secretary*—Lewis M. Biden, 11 Leadenhall Street, London, E.C.

Burnley and District Amateur Photographic Society.—(Established 1885..—Meetings, third Wednesday in each month except May, June, July, and August, at Eight o'clock, in the Mechanics' Institution. *President*—John Butterworth. *Vice-President*—D. Drew. *Committee*—John Butterworth, D. Drew, J. Pickles, J. W. Houlden, J. Holgate, W. Sutcliffe. *Treasurer and Secretary*—William Sutcliffe, 7 Bank Hall Terrace, Burnley.

Bury Photographic and Arts Club.—(Established 1882.)—Ordinary Meetings held every third Wednesday in each month. Annual Meeting, third Wednesday in October, at half-past Seven. *President*—F. Cooper. *Vice-Presidents*—E. W. Mellor and W. S. Barlow. *Council*—Robert Grundy, jun., H. M. Dearden, C. H. Openshaw, A. Taylor, R. Wood. *Auditors*—J. Newbold and W. Booth. *Treasurer*—R. Grundy, sen., Walmersly Road, Bury. *Secretary*—F. W. Livsey, 110 Victoria Terrace, Walmersly Road, Bury.

Burton-on-Trent Amateur Photographic Association.—(ESTABLISHED 1883.)—Meetings, at the Institute, Union Street, fourth Thursday in each month. *President*—Rev. J. Bramell. *Committee*—T. Gill, T. Gretton, J. Stirk. *Treasurer*—A. R. Siddels. *Hon. Secretary*—S. Sims, Malver Street, Stapenhill, Burton-on-Trent.

Cambridge University Photographic Society.—(ESTABLISHED 1882.)—Meetings and places are irregular. *President*—W. N. Shaw. *Vice-President*—Rev. A. Chapman. *Committee*—W. J. Armitage, J. B. Marsden-Smedley, W. H. Banks. *Treasurer and Secretary*—W. Harold Tingey, Trinity Hall, Cambridge.

Camera Club.—(ESTABLISHED 1885.)—21 Bedford Street, W.C. The Club is open on Week-days from ten a.m. to midnight, and on Sundays from ten a.m. to eleven p.m. It combines the ordinary advantages of a club with the appliances and conveniences of a photographic society, including the use of a well-appointed dark room, available to members at all times, enlarging apparatus, &c. A Club Journal is published and sent free monthly to members. Meetings for photographic discussion are held every Thursday at Eight p.m. from October to May. Summer Outdoor Meetings. Social gathering on the first Monday of each month from October to May. Annual Photographic Conference. *President*—Captain W. de W. Abney, R.E., C.B., F.R.S. *Committee*—Sir George R. Prescott, Bart. (*Chairman*), Frederic Machell Smith (*Vice-Chairman*), G. F. Bruce, John Beverley Campbell, Lyonel Clark, Francis Cobb, John France Collins, A. Deed, Arthur Robert Dresser, Enrico Ferrero, J. Gale, William Asbury Greene, Charles Williams Hastings, Richard Biddulph Martin, J. L. McCance, Sydney Platt, J.P., Andrew Pringle, John F. Roberts, Douglas Pound Rodgers, Sir David Salomons, Bart., Lieut.-Colonel George Hope Verney, S. B. Webber. The President and the Hon. Secretaries (*ex-officio*). *Secretaries*—George Davison and Ernest George Spiers, 21 Bedford Street, Covent Garden, W.C.

Cardiff Amateur Photographic Society.—The Monthly Meetings are held at the Society's Rooms every alternate Wednesday at Eight p.m. Informal Meetings each Wednesday evening. Rooms and Studio, Great Frederick Street, Cardiff. *President*—Alexander Kellar. *Vice-Presidents*—Samuel W. Allen, M.I.M.E., and H. Dyer. *Council*—W. H. Kitchen, W. Davies, C. Barry, John Weaver, E. Lewis, John Neale, F. Heitzman, P. H. Hacquoil, C. R. Scott, W. Furley, T. R. W. Williamson. *Treasurer*—George H. Wills, jun., Merchants' Exchange, Cardiff. *Hon. Secretary*—G. H. Bedford, 127 Bute Road.

Carlisle and County Amateur Photographic Society.—(ESTABLISHED 1885.)—Meetings, first Monday in each month in the Cathedral Hall, 57 Castle Street, Carlisle. *President*—The Mayor of Carlisle. *Vice-President*—C. S. Hall, M.R.C.S., F.M.S. *Committee*—T. Bushby, J. Robson, J. H. Coward, F. Ritson, D. L. Thorpe, J. G. Moffett. *Treasurer*—John Forsythe, 48 Aglionby Street. *Hon. Secretary*—H. Y. Thompson, L.S.A. *Hon. Assistant Secretary*—John S. Atkinson, 33 Princess Street, Carlisle.

Cheltenham Photographic Society.—(ESTABLISHED 1865.)—Meetings on the second Thursday in each month from October to May inclusive. *President*—C. E. F. Nash, M.A. *Committee*—The Officers, and Baynham Jones, G. S. Penny, W. W. Whittard. *Treasurer*—J. Bull. *Secretary*—W. C. Beetham, 22 Promenade Villas.

Chester Society of Natural Science (Photographic Section).—(ESTABLISHED 1887.)—Annual Meeting held on the last Friday in March, at Eight p.m., at the Grosvenor Museum. *Chairman*—E. W. Parnell, F.C.S. *Committee*—Dr. Stolterfoth, C. W. Townshend, E. W. Cowan, W. P. James Fawcus, F. Evans, Rev. A. H. Fish, B.Sc., A. G. Ayrton. *Treasurer and Secretary*—George Frater, 3 Lorne Street, Chester.

Cornish Camera Club.—(ESTABLISHED 1888.)—Club Meetings on the first Tuesday in each month at the Royal Cornwall Geological Museum. *President*—G. Lacy. *Vice-President*—B. Vivian, M.R.C.S. *Council*—Colonel J. H. Biggs, W. E. Baily, F.L.S.P., N. H. Symons. *Hon. Treasurer*—W. H. Percy. *Hon. Secretary*—A. K. Barnett, F.G.S., 11 Penrose Terrace, Penzance.

Coventry and Midland Photographic Society.—(ESTABLISHED 1883.)—Meetings are held on the first Wednesday in each month at the Dispensary at Eight p.m. Outdoor Excursions during the summer months. Annual Meeting in November. *President*—Councillor Andrews. *Vice-Presidents*—C. Ambrose, C. H. Waters, H. Sturmey, G. Winstanley. *Committee*—F. W. Hardy, T. W. Owen, A. B. Clarke, W. L. J. Orton, and the whole of the Officers. *Treasurer*—E. J. Walker. *Hon. Secretary*—Fred. W. Dew, The City Studio, Coventry.

Dartmouth Amateur Photographic Society.—*President*—Roger Mostyn. *Committee*—E. Anwyl, E. Bearcroft, B. Michelmore, C. Michelmore, C. Sims, J. H. Spanton, William Simpson, G. R. Whitaker, R. Whitaker. *Hon. Secretary and Treasurer*—George Barnston.

Derby Photographic Society.—(Established 1884.)—Ordinary Monthly Meetings, second Tuesday in each month. Annual Meeting, second Tuesday in October. Held at Sykes's Restaurant, Victoria Street, Derby. *President*—Captain W. de W. Abney, R.E., C.B., F.R.S. *Vice-Presidents*—C. Bourdin, A. B. Hamilton, R. Keene, T. Scotton. *Committee*—J. A Cope, Dr. Highton, W. Hart, C. B. Keene, R. Woods. *Treasurer and Secretary*—E. J. Lovejoy, 73 Grove Street, Derby.

Dorset Amateur Photographic Association.—(Established 1886.)—*President*—W. Miles Barnes, M.A. (Cantab.). *Committee*—G. Dawson-Damer, J.P., Dr. George, R. M. Lee, F. Dymond. *Secretary*—E. J. Pope, M.A. (Oxon.), Bradford-Peverell Rectory, Dorchester.

Dukinfield Photographic Society.—(Established 1888.)—Ordinary Meetings, Co-operative Hall, fourth Tuesday, at half-past Seven. Annual Meeting, fourth Tuesday in April. *President*—John Ashworth. *Vice-Presidents*—John T. Lees, T. H. Gordon, B.A., J. H. Brooks. *Council*—W. Jenkinson, J. Leech, J. T. Lambert, G. Robinson, C. W. Thompson J. Winterbottom. *Treasurer*—H. Veevers, C.E. *Secretary*—William H. Thirley, Commercial Buildings, King Street, Dukinfield.

Dundee and East of Scotland Photographic Association.—(Established 1879.)—Meetings are held on the first Thursday of each month from October till May both inclusive, in Lamb's Hotel, Dundee, at Eight p.m., and three Outdoor Meetings during summer. *Patron*—The Right Hon. The Earl of Strathmore. *Hon. President*—Thomas Carnelley, D.Sc., University College. *Acting President*—John Robertson. *Vice-President*—J. K. Tulloch, M.B. *Council*—J. C. Cox, J. D. Cox, W. B. Dickie, G. D. Macdougald, G. G. Maclaren, J. Mathewson, F. Salmond, A. Stewart, W. D. Valentine, J. R. Wilson. *Hon. Treasurer and Secretary*—V. C. Baird, Broughty Ferry, by Dundee.

Edinburgh Photographic Society.—(Established 1861.)—Ordinary Meetings are held on the first Wednesday of each month, except July, August, and September, in the Professional Hall, 20 George Street, at Eight o'clock. The Annual Meeting is held in November. *Patron*—H.R.H. The Duke of Edinburgh. *President*—Hippolyte J. Blanc, F.S.A. Scotland. *Vice-Presidents*—Thomas W. Drinkwater, M.D., F.C.S., William T. Bashford. *Council*—J. C. H. Balmain, F. Brighmen, John Hay, Alexander A. Inglis, Alexander Ayton, F. P. Moffat, A. H. Baird, W. B. Mitchell, W. Dougall, W. Forgan, G. G. Mitchell, T. Wardale. *Curator*—Herbert W. Bibbs. *Treasurer*—James McGlashan. *Secretary*—Hugh Brebner, 13 Maitland Street, Edinburgh.

Edinburgh Photographic Club.—(ESTABLISHED 1881.)—The Ordinary Meetings are held at 5 St. Andrew Square, at Eight o'clock p.m., on the third Wednesday of each month. The Annual Meeting on the third Wednesday of November. The Club is limited to Thirty Members. *Board of Management: Convener*—Dr. John Thomson, R.N. *Treasurer*—James C. H. Balmain. *Secretary*—James Jameson, 84 Pitt Street, Edinburgh.

Glasgow and West of Scotland Amateur Photographic Association.—(ESTABLISHED 1882.)—Rooms, 180 West Regent Street, Glasgow. Ordinary Meetings, third Tuesday of each month, October to April, at half-past Seven p.m. Annual Meeting in January. Informal Meeting, every Tuesday throughout the year at Eight p.m. Dark room available for visitors. *President*—Ralph H. Elder. *Vice-President*—Patrick Falconer. *Council*—William Lang, jun., R. B. M. Stewart, J. C. Oliver, Archibald Watson, John McKissack, James Fleming. *Treasurer*—Hugh Reid. *Secretary*—William Goodwin, 3 Lynedoch Street, Glasgow.

Glasgow Photographic Association.—(ESTABLISHED 1862.)—Meetings are held in Religious Institution Rooms, 177 Buchanan Street, first Thursday in each month, at Eight p.m. *President*—William Lang, jun., F.C.S. *Vice-Presidents*—Archibald Robertson and Robert T. Dodds. *Council*—T. N. Armstrong, William Brown, George Mason, William J. McIlurick, Andrew Mactear, J. Urie, jun. *Treasurer*—George Bell, 57 Argyle Street, Glasgow. *Secretary*—J. Craig Annan, 153 Sauchiehall Street, Glasgow.

Gloucestershire Photographic Society.—(RECONSTRUCTED 1887.)—Ordinary Meetings, fourth Monday in each month, at half-past Eight p.m., at School of Science, Gloucester. Annual Meeting in April. *President*—George Embrey, F.C.S., F.R.Met.Soc. *Vice-President*—Walter B. Wood. *Committee*—W. J. Jenkins, A. H. Pitcher, J. D. Robertson. *Treasurer*—Henry S. Crump. *Secretary*—Frank H. Burr, Midland Road, Gloucester.

Hastings and St. Leonards Photographic Society.—Meetings are held on the second Monday in each month. *President*—Wilson Noble, M.P. *Vice-Presidents*—Lord Brassey of Bulkeley, K.C.B., Councillor Stubbs, J. H. Blomfield, S. W. Bultz, M. Sullivan, M. Wright, W. Mayor, W. Shuter, Dr. Routh, Rev. A. M. Macdona, Rev. A. B. Cotton. *Council*—Rev. A. M. Macdona, H. F. Bultz, M. Sullivan, T. W. Thomas, G. Bradshaw, W. Mayor. The President, Treasurer, and Secretaries, belong to the Council *ex officio*. *Treasurer*—Rev. A. B. Cotton. *Joint Secretaries*—T. J. Northy, F.S.Sc., and A. Brooker.

Halifax Photographic Club.—(ESTABLISHED 1881.)—Meets the last Thursday in each month in the Mechanics' Hall at half-past Seven, p.m. *President*—B. Rowley. *Vice-Presidents*—T. Illingworth and E. J. Smith. *Council*—B. B. Bingley, Major Holroyde, Henry Mossman, Councillor S. Smith, Joseph Whiteley, together with the Officers. *Auditor*—S. Goodman. *Treasurer*—E. H. Child. *Hon. Secretary*—W. Clement Williams, 13 Aked's Road, Halifax.

Hampstead Photographic Club.—(ESTABLISHED 1887.)—Meets on second and fourth Mondays during the winter months at the Members' houses in turn, and once a month during the summer. *Hon. Treasurer*—C. A. Watkins. *Hon. Secretary*—B. W. Wild, Gladesmore, Willesden Lane, N.W.

Holmfirth Amateur Photographic Association.—(ESTABLISHED 1885.)—Meetings are held monthly on the first Tuesday of each month at half-past Seven, at the residences of each member in succession. *Council*—The Members of the Association. *Hon. Treasurer*—Thomas Brownson. *Hon. Secretary*—Thomas Brownson, Binn Villa, Holmfirth.

Hull Amateur Photographic Society.—(ESTABLISHED 1884.)—*President*—Sir A. K. Rollit, M.P. *Vice-President*—C. F. Amos. *Council*—Edward Bolton, J. Chatham, E. H. Howlett, C. D. Holmes, J. Stothard, J. Walker. *Treasurer*—H. W. R. Smith. *Secretary*—D. W. Sissons, 84 Beverley Road, Hull.

Hyde Photographic Society.—(ESTABLISHED 1885.)—Annual Meeting, third Wednesday in October. Ordinary Meetings, third Wednesday in each month from September to April inclusive. *President*—John Pennington. *Vice-President*—Dr. G. W. Sidebotham. *Committee*—F. W. Cheetham, F. Bland, Allan H. Hall, Henry H. Clayton, E. E. Dawson, H. Secker. *Auditors*—Percy Oldham and Harry Hall. *Treasurer*—John Hall Brooks. *Secretary*—William H. Middleton, 120 Hyde Lane, Hyde.

Ipswich Photographic Society.—(ESTABLISHED 1888.)—The Meetings of the Society are held in the Art Gallery, Ipswich, on the second Tuesday in each month except May, June, July, August, and September. *President*—J. Dixon Piper. *Vice-Presidents*—H. H. P. Powles and Frank Mason. *Committee*—N. Adlard, A. H. Cade, R. Cash, A. F. Penraven, J. C. Wiggin, F. Woolnough. *Hon. Secretary and Treasurer*—E. R. Pringle, 83 Berners Street, Ipswich.

Lewes Photographic Society.—(ESTABLISHED 1888.)—Ordinary Meetings are held on the first Tuesday in each month at the Glee Room, Cliffe, at eight p.m. *President*—J. G. Braden. *Vice-President*—J. Tunks. *Committee*—D. Blagrove, jun., C. Corder, R. Morphew, P. Morris, H, Harvey Smith.—*Hon. Secretary and Treasurer*—E. J. Bedford, 10 St. John's Terrace, Lewes.

Kendal Literary and Scientific Institution (Photographic Section).—(ESTABLISHED 1886.)—Meetings are held in the Museum Library on the second Wednesday in each month at half-past Seven p.m. Annual Meeting in September. Field Meetings during the summer months at convenient times. *Chairman*—F. W. Crewdson. *Committee*—Isaac Braithwaite, F. Armstrong, Hon. Secretary of the Institution (J. Severs), Chairman, Treasurer, and Secretary of Section. *Treasurer*—Samuel Rhodes. *Secretary*—Charles E. Greenall, Prospect, Kendal.

Leeds Photographic Society.—(RE-ESTABLISHED 1881.)—Meetings take place at Eight p.m. on the first Thursday in each month, unless otherwise arranged. Annual Meeting, first Thursday in December. *President*—Colonel T. W. Harding. *Vice-Presidents*—Rev. A. Standidge and Thomas W. Thornton. *Committee*—T. Butterworth, W. Denham, G. H. Rodwell, B. T. McKay, Captain Plummer, and the Officers of the Society. *Treasurer*—Thomas Dawson, 35 Reginald Terrace, Leeds. *Secretary*—S. A. Warburton, 12 Waverley Terrace, Leopold Street, Leeds.

Leicester and Leicestershire Photographic Society.—(ESTABLISHED 1885.)—Meets second Wednesday in each month, at Mayor's Parlour, Old Town Hall, at half-past Seven p.m. Recess—June, July, August, and September. Annual Meeting for Election of Officers in January. *President*—George Bankart. *Vice-President*—Charles Underwood. *Committee*—George Toller, W. Sculthorp, W. T. Tucker, F. W. Broadhead. *Treasurer*—W. Sculthorp. *Secretary*—Henry Pickering, Highcross Street, Leicester.

Leith Amateur Photographic Association.—(ESTABLISHED 1888.)—Meetings held on the last Tuesday of every month at Eight p.m. Annual General Meeting, last Tuesday of January. *President*—William Dougall. *Vice-President*—W. F. Walker. *Council*—George Simpson, T. W. Dewar, R. C. Ewart, Robert Hunter, William Callender, Walter Ross, William Swanston, M. Campbell, Thomas Wilson. *Treasurer*—Alexander Pitkethly. *Hon. Secretary*—A. D. Guthrie, 7 Pitt Street, Leith.

Liverpool Amateur Photographic Association.—(ESTABLISHED 1863.)—Meetings, last Thursday in each month, except December, at Six p.m., held at the Royal Institution, Colquitt Street. *President*—B. J. Sayce. *Vice-Presidents*—F. T. Paul, F.R.C.S., and H. N. Atkins. *Council*—A. W. Beer, A. W. Cornish, J. H. Day, J. W. Kirby, R. R. Gibbs, G. A. Kenyon, M.D., P. H. Phillips, E. Twigge, P. Lange, H. Lupton, W. P. Riley, G. H. Rutter. *Treasurer*—J. Earp. *Secretary*—W. A. Watts Highfield Road, Appleton, Widnes.

Literary Photographic Club.—(ESTABLISHED 1887.)—Founded for the circulation and exchange among the members of photographs of literary interest, or of places rendered celebrated by eminent persons. *Hon. Secretary*—R. A. R. Bennett, Walton Manor Lodge, Oxford.

London and Provincial Photographic Association.—(ESTABLISHED 1882.)—Meetings held at Mason's Hall Tavern, Mason's Avenue, Basinghall Street, E.C., every Thursday evening at Eight o'clock. *Trustees*—J. Traill Taylor and J. B. B. Wellington. *Committee*—H. D. Atkinson, J. J. Briginshaw, F. P. Cembrano, J. T. Collins, E. Clifton, P. Everett, L. Medland, C. H. Trinks. *Curator*—A. Haddon. *Treasurer*—W. H. Prestwich. *Hon. Secretary*—F. A. Bridge, East Lodge, Dalston Lane, London, N.E.

Manchester Amateur Photographic Society.—(ESTABLISHED 1885.)—Ordinary Meetings held on the second Tuesday in each month, at the Manchester Athenæum. General Meeting, last Tuesday in January. *President*—Rev. H. J. Palmer, M.A. *Vice-Presidents*—J. Davenport, S. F. Flower, H. Smith, J. W. Wade. *Committee*—T. M. Brooke, Thomas Carter, G. J. Crippin, Charles Dawson, J. Furnivel, Rev. H. V. Macdona, G. H. Rigby, J. H. Seed, James Whitham, R. B. Wilson. *Treasurer*—J. G. Jones. *Librarian*—George H. B. Wheeler. *Secretary*—F. W. Parrott, 53 Chapel Street, Salford.

Manchester Camera Club.—(ESTABLISHED 1883.)—Meetings held at the Victoria Hotel on the third Wednesday in each month. *Committee*—J. W. Leigh, T. Sefton, J. G. Jones. *Treasurer*—J. T. Foster. *Hon. Secretary*—T. Steventon, 23 Pembroke Grove, Manchester.

Manchester Photographic Society.—(ESTABLISHED 1855.)—Meetings, second Thursday in each month throughout the year at 36 George Street. Lantern Section Meetings, fourth Wednesday from September to March. *President*—Sir Henry E. Roscoe, M.P. *Vice-Presidents*—Canon Beechey, John Schofield, Abel Heywood, jun., Alan Garnett, J. S. Pollitt. *Council*—T. Chilton, H. Smith, W. Watts, Dr. W. G. Sidebotham, R. Atherton, C. F. Brenan, W. Broughton, T. R. Cobley, C. Estcourt, J. W. Leigh. *Lantern Committee*—Dr. Sidebotham, W. Broughton, C. F. Brenan, H. M. Whitefield. *Librarian*—John Schofield. *Treasurer*—W. G. Coote. *Hon. Secretary*—W. I. Chadwick, Brooklands, Manchester.

North Kent Amateur Photographic Society.—The Meetings are held on the first Thursday in each month at Eight p.m. *President*—J. C. Johnson, J.P. *Hon. Secretary*—G. W. Cobham, 3 Edwin Street, Gravesend.

Newcastle-on-Tyne and Northern Counties' Photographic Association.—(ESTABLISHED 1881.)—Meetings held in the Mosley Street Café, Newcastle-on-Tyne, on the second Tuesday in each month, at half-past Seven p.m., except May, June, July, August, and September. *President*—Alex. S. Stevenson, J.P. *Vice-Presidents*—J. P. Gibson and H. P. Procter. *Council*—M. Auty, T. Galloway, H. C. Hemy, J. F. Maling, W. Parry, J. Pike, J. W. Robson, E. Schümann, H. Shand, L. Williamson. *Hon. Treasurer*—P. M. Laws, 38 Blackett Street, Newcastle-on-Tyne. *Hon. Secretary*—Edgar G. Lee, 3 Woodbine Road, Gosforth, near Newcastle-on-Tyne.

Norfolk and Norwich Photographic Society.—(ESTABLISHED 1888.)—General Meetings, first and third Friday in each month from October to May inclusive, and first Friday in each month from June to September inclusive, at Eight o'clock. Annual General Meeting, first Friday in March. *President*—F. W. Harmer, Mayor of Norwich. *Vice-Presidents*—W. H. Dakin, P. H. Emerson, B.A. (Cantab.), Samuel Hoare, M.P., G. J. Newbegin. *Committee*—James Barnes, B. Bullen, C. R. Crosskill, J. Griffin, T. P. Lugton, W. Otty, H. Pechey, T. W. Spalding. *Treasurer*—D. Howie. *Hon. Secretary*—Sparham Camp, Havelock Road, Norwich.

North London Photographic Society.—(ESTABLISHED 1885.)—The Ordinary Meetings are held on the first and third Tuesday in every month at Myddelton Hall, Islington, N. Excursions every Saturday afternoon from Easter to Michaelmas. *President*—J. Traill Taylor. *Vice-Presidents*—A. Mackie and E. Clifton. *Council*—J. Jackson, F. G. Reader, L. Medland, W. F. Coventon, Rev. E. Healey, A. C. Cassor, J. Oakley, W. Bishop. *Curator*—W. Few. *Hon. Secretary and Treasurer*—N. P. Fox, 2 Princess Terrace, Primrose Hill, N.W.

North Middlesex Photographic Club.—(ESTABLISHED 1888.)—Meetings, fortnightly, on Monday evenings, at half-past Seven, in the Iron Room, Stroud Green. *President*—John Humphries, F.S.A. *Vice-Presidents*—H. Beckett and E. Traill Hiscock. *Council*—F. W. Hart, F.C.S., T. C. Lathbridge, W. A. Lavanchy, J. Saville, J. L. Treadway, H. Walker. *Curator*—Fred. E. Jones. *Treasurer*—E. Seymour Paul. *Secretary*—Ernest F. C. Damant, 25 Granville Road, Stroud Green, N.

North Surrey Photographic Society.—(ESTABLISHED 1888.)—Meets every alternate Tuesday at the West Norwood Constitutional Club, Norwood Road, S.E. *Committee*—W. H. Walker, L. Wolff, R. Crossthwaite, A. Rider, B. Wilkinson, G. R. Fludder. *Hon. Secretary and Treasurer*—Harold Senier, F.I.C., F.C.S., 88 Norwood Road. S.E.

Nottinghamshire Amateur Photographic Association.—(ESTABLISHED 1883.) Club Rooms, Cavendish Chambers, 19 Market Street. Ordinary Meetings, alternate Mondays, at Eight o'clock. Annual Meeting, first Monday in October. Dark room. *President*—Henry Blandy, L.D.S. (Edin.). *Vice-Presidents*—G. A. Bull and S. Wells. *Committee*—W. Burrows, T. Carnell, Dr. W. T. Crew, W. J. Collings, J. F. Lewis, J. C. Lancaster, A. Pickard, J. Spray, H. Turton, H. A. A. Wigley, G. E. Williamson, S. W. Woodroffe. *Treasurer*—B. Sturges Dodd. *Secretary*—P. E. Knight, 39 Burford Road, The Forest, Nottingham.

Oldham Photographic Society.—(ESTABLISHED 1867.)—All Meetings are held at the Lyceum, Union Street, Oldham. Monthly Meetings on the last Thursday in each month, in the Club Room, at a quarter to Eight p.m. Weekly Meetings every Thursday evening, in the Society's Room from Eight to Ten. The Annual Meeting is held on the last Thursday in October. *President*—John Greaves, jun. *Vice-President*—Tom Heywood. *Council*—John Chadwick, John William Cooper, Edward H. Dixon, John Fullalove, James Hall, James Henry Prestwich, Wallace Thompson. *Librarian*—Moses Piper. *Treasurer*—John William Whitehead. *Secretary*—Thomas Widdop, 16 Burnaby Street, Oldham.

Oxford University Photographic Club.—(ESTABLISHED 1884.)—Meetings held at Eight o'clock every other Thursday or Friday during Term in the Club Rooms. *President*—G. S. Edwards, 16 Crick Road. *Committee*—E. W. H. Evers (Christ Church), A. A. Jackson (Magdalen), J. B. Allan (Oriel). *Hon. Secretary and Treasurer*—J. D. Ackland (Christ Church).

Paisley Photographic Society.—(RE-ESTABLISHED 1885.)—Monthly Meetings at Eight p.m., in Paisley Museum, first Tuesday in each month from October till April inclusive. *President*—H. H. Smiley. *Vice-President*—Robert Harris. *Council*—James Donald, Alexander Fullerton, George Robertson, Thomas Rustall. *Treasurer*—Matthew Morrison. *Secretary*—Robert Cairns, Castlehead, Paisley.

Peterborough Photographic Society.—(Established 1887.)—Meetings, monthly. General Meeting, first Monday in June. *President*—Dr. G. Kirkwood. *Vice-Presidents*—The Very Rev. the Dean, Rev. Canon Argles, Dr. T. J. Walker, J.P., Dr. J. M. Kennedy, J. H. Hetley, J. H. Pearson, E. Worthington. *Committee*—W. H. Marsh, A. Nichols, F. Pepperdine, J. E. Saunders, A. C. Taylor. *Hon. Secretary and Treasurer*—R. Child Bayley, Kirkton House, The Precincts, Peterborough.

Photographers' Benevolent Association.—(Established 1873.)—Meetings as required. *President*—J. Traill Taylor. *Committee*—William Bedford (*Chairman*), T. J. Collins (*Deputy Chairman*), H. D. Atkinson, F. H. Berry, W. F. Benham, T. Bolas, J. J. Briginshaw, E. Clifton, T. E. Freshwater, H. M. Hastings, W. J. B. Humphreys, H. G. White, J. Zaehnsdorf. *Auditors*—J. S. Rolph and Alexander Mackie. *Hon. Solicitor*—W. F. Benham. *Trustees*—Captain W. de W. Abney, R.E., F.R.S., and W. S. Bird. *Treasurer*—John Stuart, 112 New Bond Street, W. *Central Secretary*—H. Harland, 83 Hawksley Road, Stoke Newington, N. *Hon. Local Secretaries*—Bath: H. J. Walker, 8 Broad Street; Brighton: F. Hambly, 69 Upper Lewes Road; Bristol: T. Protheroe, 35 and 36 Wine Street; Derby: R. Keene, All Saints'; Edinburgh: H. W. Bibbs, 26 Myrtle Terrace, Slateford Road; Glasgow: J. Davie, 186 Sauchiehall Street; Huddersfield: H. M. Smith, 20 John William Street; Newcastle: J. B. Payne, Mosley Street; Norwich: J. Howie, 85 St. Giles' Street; Plymouth: J. E. L. Brokenshire, 48 Hotham Place, Millbridge; Sheffield: T. S. Hicks, 141 Cemetery Road; Shrewsbury: J. Pyefinch, Mardol Head.

Photographic Society of Ireland.—(Established 1879.)—Meetings at the Royal College of Science on the second Friday of the month from October to May inclusive, at Eight p.m. *President*—Sir Howard Grubb, F.R.S. *Vice-President*—George Mansfield, J.P. *Council*—A. Conan, Greenwood Pim, T. Mayne, M.P., H. Bewley, Dr. Cosgrave. *Treasurer*—T. A. Bewley. Secretary not yet appointed.

Postal Photographic Society.—(Established 1886.)—Founded for the circulation, criticism, and exchange of prints taken by the members. *President*—Horace Day, M.D. *Committee*—Horace Day, M.D., A. Bryans, Rev. W. Miles Barnes, H. N. Malan, Robert Tindall, Walter Withall. *Hon. Secretary*—R. A. R. Bennett, Walton Manor Lodge, Oxford.

Photographic Club.—(ESTABLISHED 1879.)—Meetings every Wednesday night at Eight o'clock. Annual Meeting on the first Wednesday in November. *Trustees*—William Ackland and T. Charters White. *Committee*—W. Bedford, F. A. Bridge, W. Cobb, E. W. Foxlee, A. Mackie, J. Nesbit, J. B. B. Wellington, J. W. Zaehnsdorf. *Curator*—H. M. Hastings. *Librarian*—Edgar Clifton. *Treasurer and Secretary*—Edward Dunmore, 83 Corinne Road, Tufnell Park, London, N.

Photographic Society of Great Britain.—(ESTABLISHED 1853.)—The Ordinary Meetings are held at the Gallery of the Royal Society of Painters in Water Colours, 5A Pall Mall East, at Eight o'clock p.m., on the second Tuesday of each month from November to June inclusive. Annual General Meeting on the second Tuesday in February. Extra Meetings, called 'Technical Meetings,' are held on the fourth Tuesday in each month. *Patrons*—Her Majesty the Queen and H.R.H. the Prince of Wales. *President*—J. Glaisher, F.R.S., F.R.A.S., 1 Dartmouth Place, Blackheath, S.E. *Vice-Presidents*—Captain W. de W. Abney, R.E., F.R.S., F.C.S., H. P. Robinson, H. Trueman Wood, M.A. *Council*—C. E. Abney, G. L. Addenbrooke, W. Bedford, Valentine Blanchard, T. Bolas, F.C.S., T. M. Brownrigg, Francis Cobb, William Cobb, Alexander Cowan, T. Sebastian Davis, F.C.S., G. Davison, P. H. Emerson, B.A., M.B. Cantab., W. England, J. Gale, John Spiller, F.C.S., F.I.C., J. Traill Taylor, S. G. B. Wollaston. *Treasurer*—Walter S. Bird. *Assistant Secretary*—Edwin Cocking, 5A Pall Mall East, S.W.

Portsmouth Amateur Camera Club.—(ESTABLISHED 1888.)—Meetings are held in the Young Men's Christian Association Buildings, Edinburgh Road, Landport, on the first and third Wednesday in each Month. *President*—B. Jeffery. *Vice-Presidents*—H. Hickey and R. Carrick. *Committee*—R. Carrick, L. Cooper, W. H. Cooke, F. Hooper, C. Jurd, E. H. Martlew, C. Nicholas, &c. *Hon. Treasurer*—H. Nicholas. *Hon. Secretary*—G. Knight, 12 Middle Street, Southsea.

Shaftesbury Photographic Social.—(ESTABLISHED 1888.)—Meetings held every Friday evening at half-past Eight at the Craven Lecture Hall, Foubert's Place, Regent Street, London, W. *President*—G. Davidson. *Vice-Presidents*—A. Ibbetson and O. J. Holder. *Committee*—T. F. K. Wilson, R. Aitken, G. A. E. Robinson, D. T. Rintoul, H. Miles, N. Baker. *Treasurer*—T. T. Samora. *Hon. Secretary*—John B. Rintoul, 36 Brewer Street, Regent Street, W.

Sheffield Photographic Society.—(Established 1876.)—Meetings held the first Tuesday in the month, at half-past Seven, in the Masonic Hall. Annual Meeting in October. *President*—T. Firth. *Vice-Presidents*—B. J. Taylor and J. Hunt. *Council*—J. Bromley, W. H. Bacon, J. W. Charlesworth, C. F. Longden, Jonathan Taylor. *Hon. Treasurer*—Bradley Nowill. *Hon. Secretary*—Ernest Beck, Fairmont, Shoreham Street, Sheffield.

Shropshire Camera Club.—(Established 1886.)—Ordinary Meetings, second Monday in each month. Annual Meeting held in January. All Meetings at 9 The Square, Shrewsbury. *President*—E. Cresswell Peele. *Vice-President*—H. H. Hughes. *Council*—W. Alltree, W. Bowdler, Dr. E. Cureton, W. E. Litt, E. Lloyd Oswell, J. Pyefinch, F. W. Simpson, F. W. Williams. *Treasurer*—M. J. Harding. *Hon. Secretary*—Walter W. Naunton, 9 The Square, Shrewsbury.

St. Bride's Mutual Photographic Society.—(Established 1887, under the name of 'The Teachers' Photographic Society.')—Meet for outings the first Saturday, and for discussions the third Wednesday in each month. Place of Meeting varies. Annual General Meeting for Election of Officers in April. *President*—W. Rice, 86 Fleet Street. *Patrons*—Captain W. de W. Abney, R.E., F.R.S., &c., and The Rev. A. Johnson, M.A., F.L.S. *Council*—J. Colman, Oatlands Park Board School, Weybridge; A. Gill, 12 King Edward's Road, Hackney; D. R. Lowe, 37 Lorrimore Square, S.E.; A. Nunn, 48 Davisville Road, Shepherd's Bush, W. *Treasurer*—G. A. Freeman, B.Sc., F.G.S., 51 Danby Street, Denmark Park, S.E. *Secretary*—Fred. Brocas, 86 Fleet Street, E.C.

Stockton Amateur Photographic Association.—(Established 1886.)—Meetings, second Tuesday in each month. *President*—C. Arthur Head. *Vice-President*—J. H. Jackson. *Committee*—J. H. Draper, F. A. Graham, W. Downes, J. H. Rhodes, W. Hodgson, W. W. Stainthorpe. *Secretary and Treasurer*—Frank Appleby, Rosslyn Terrace, Stockton-on-Tees.

Sun & Company.—A Postal Photographic Society for the monthly circulation and criticism of photographs, entirely the work of members, and for a general interchange of ideas, with a view to mutual advancement in the science and art of photography. Application as to vacancies for membership should be sent, with stamp for reply, to the Hon. Secretary, Martin J. Harding, 6 College Hill, Shrewsbury.

Sutton (Scientific Society) Photographic Club.—(Established 1886.)—Meetings are held on the first Tuesday in each month at the Society's Rooms, Sutton, Surrey, at Eight p.m. *Chairman*—A. R. Wormald. *Recorder*—H. E. Murchison.

Swansea Amateur Photographic Association.—(ESTABLISHED 1888.)—Ordinary Meetings held on the last Friday of each month. Annual Meeting, October. *President*—B. H. Morgan. *Vice-President*—W. E. Brown. *Treasurer*—H. Hoskins. *Hon. Secretary*—E. Ernest Morgan, 1 Eaton Crescent, Swansea.

The Photographic Convention of the United Kingdom.—(ESTABLISHED 1886.)—*President*—A. Pringle. *Council*—W. Bedford, W. Cobb, W. England, S. G. B. Wollaston, F. A. Bridge, J. R. Gotz, F. P. Cembrano, H. M. Hastings, J. B. B. Wellington, W. H. Walker, J. Traill Taylor, J. W. Whitehead, W. W. Naunton, C. H. Bothamley, W. Lang, jun., G. W. Webster, A. Cowan, R. Keene, W. H. Prestwich, G. Mason, J. M. Turnbull, A. Tate, W. Jerome Harrison, A. Werner. *Treasurer*—S. G. B. Wollaston. *Secretary*—J. J. Briginshaw, 128 Southwark Street, London, S.E.

Ulster Amateur Photographic Society.—(ESTABLISHED 1887.)—Meetings are held at the Museum on the second Monday of each month from October till April inclusive, at half-past Seven p.m. *President*—Professor Letts, Ph.D., F.R.S.E., F.C.S. *Vice-Presidents*—James Stelfox and James Wilson. *Committee*—J. J. Andrew, John Brown, William Firth, William Gray, William Swanston, Alexander Tate. *Hon. Treasurer and Secretary*—Edward Braddell, Malone Park, Belfast.

Wallasey Photographic Association.—(ESTABLISHED 1886.)—Ordinary Meetings, first Wednesday in each month, at Eight p.m., at the Egremont Institute, Egremont, Cheshire. Annual Meeting, first Wednesday in November, at the same hour and place. *President*—H. Wilkinson. *Council*—Messrs. Wilson, Nicholson, Eaton, Wignall, Reader, Sharrock. *Auditor*—J. Bardsley. *Hon. Treasurer*—J. Fullerton. *Hon. Secretary*—J. W. Gregg, Poplar Terrace, Liscard, Cheshire.

West Surrey Amateur Photographic Society.—The Ordinary Monthly Meetings are held at the Lecture Hall (next the Chapel), Mallinson Road, Wandsworth Common, and Saturday afternoon excursions take place fortnightly during the summer months. *President*—J. Gale. *Vice-Presidents*—G. Davison and W. Winsford. *Committee*—Messrs. Roberts, Godfrey Hillier, Martin, Smith, Robertson, Borley. *Hon. Secretary*—John Watkinson, 42 Honeywell Road, Wandsworth Common.

Yorkshire College Photographic Club.—(ESTABLISHED 1883.)—The Meetings are held in the College Buildings in each month throughout the session. During the summer months Excursions will be made to places of interest. Annual meeting in June. *President*—C. H. Bothamley, F.I.C. *Committee*—J. Pocklington, A. E. Nichols, Miss S. Knight. *Hon. Secretary and Treasurer*—Harry B. Hall, 20 Regent Terrace, Hyde Park Road, Leeds.

Yorkshire Philosophical Society (Photographic Section).—Meetings are held in the Museum on the first Monday in every month, at Eight p.m. Excursions during the summer. *President*—W. Monkhouse. *Vice-Presidents*—Dr. Anderson and Dr. Hitchcock. *Committee*—Dr. Hingstone, G. Cussons, J. Backhouse, jun., M. Spence. *Hon. Secretary and Treasurer*—Henry R. Moiser, Heworth Grange, York.

Amateur Photographic Association of Victoria, Melbourne.—The Association meets on the second Tuesday in each month at the Royal Society's Hall, Victoria Street, Melbourne. Visitors from British, American, or Continental Societies will be made welcome at any of the Meetings. *President*—E. C. Bell. *Vice-Presidents*—F. A. Kernot and John Lang. *Committee*—J. H. Mulvany, H. C. Ward, J. McEwan, A. M. Henderson, E. J. Hughes. *Hon. Librarian*—E. A. Walker. *Scientific Custodian*—R. W. Harvie. *Hon. Treasurer*—J. J. Fenton. *Hon. Secretary*—J. H. Harvey, 278 Victoria Parade, East Melbourne.

Auckland Photographic Society.—*Secretary*—J. H. Sinclair, Auckland, New Zealand.

Queensland Photographic Society.—(Established 1884.)—Ordinary Meetings held on the 15th of each month. *President*—Hon. A. C. Gregory, M.L.C., F.R.G.S. *Vice-Presidents*—Professor J. H. Pepper, J. W. Sutton, W. C. Hume. *Committee*—D. T. Lyons, T. Mirfin, H. W. Fox. *Librarian*—F. R. Hall. *Treasurer*—C. A. Gilder. *Hon. Secretary*—C. M. Allen, Diocesan Registry, George Street, Brisbane.

Tasmanian Photographic and Art Association.—(Established 1887.)—Meetings, second Friday in each month. *Patron*—Sir R. G. C. Hamilton, K.C.B. *Vice-Patrons*—Sir Lambert Dobson and Dr. Agnew. *President*—Russell Young. *Vice-Presidents*—Robert Henry, S. Clemes, A. Morton, C. Allport, Edward Scott. *Committee*—E. R. Ash, F. Paterson, J. W. Dear, C. A. Woolly, H. Downing, R. McGuffie. *Librarian*—Nat Oldham. *Treasurer*—A. L. Butler. *Secretary*—John F. Echlin.

Victoria Camera Club.—Meetings every third Thursday in each month. Field Meetings every three weeks in summer. *President*—A. M. Henderson, C.E. *Vice-Presidents*—J. T. Cosgrave and H. F. Young. *Treasurer*—James Pettigrew. *Secretary*—C. F. Burrows, 5 Queen Street, Melbourne.

Wellington Amateur Photographic Society.—*Secretary*—W. Williams, Wellington, New Zealand.

Amateur Photographic Society of Madras.—*Patron*—Lieut.-General Sir C. G. Arbuthnot, K.C.B., R. A. Commander-in-Chief, Madras. *President*—F. B. Hanna, M.A., M.I.C.E. *Vice-Presidents*—J. C. Hannyngton, C.S., and C. Michie-Smith, B.Sc. *Committee*—Colonel A. Curtois, D. E. W. Leighton, G. Oppert, Ph.D., W. G. Pavey, C. V. Sundarum Sastri, Captain R. H. C. Tufnell, M.S.C. *Secretary and Treasurer*—F. Dunsterville, Rayapuram, Madras.

Photographic Society of India.—Club room and dark room, 29 Chowringhee Road, Calcutta. *President*—Surgeon-General Sir B. Simpson, M.D. *Vice-President*—Nawab Ashanallah Khan Bahadoor of Dacca. *Committee*—J. G. Apcar, P. Donaldson, N. Giannacopulo, J. Macdowell, H. C. Pinkerton, A. Tocher. *Hon. Secretaries and Treasurers*—J. S. Gladstone and A. Flemming, 8 Clive Street, Calcutta.

AMERICAN PHOTOGRAPHIC SOCIETIES.

Association of Operative Photographers of New York.—Established 1880. Meetings first and third Wednesdays in each month. Annual Meeting, first Meeting in March, at Eight o'clock p.m. Meetings held at 392 Bowery. Thomas W. Power, President. Thomas C. Roche, Vice-President. D. Fields, O. Buehler, A. Mildenberger, Trustees. Emil Stoll, Treasurer. William Eddowes, Secretary, 770 Broadway, New York City. C. Sprotte, Financial Secretary. C. Faulkner, Librarian.

Baltimore Amateur Photographic Association.—Meets on the first Thursday in each month. Executive and Annual Meetings in October. John P. Bigham, President. Philip Prado, Vice-President. Arthur W. Nyce, Secretary and Treasurer, 26 North Gay Street, Baltimore, Maryland.

Boston Society of Amateur Photographers.—Established October, 1882. E. F. Wilder, President. G. E. Cabot, Vice-President. J. H. Thurston, Secretary and Treasurer.

Chicago Photographic Association.—Established 1871. Place of Meeting, 229 State Street. Ordinary Meetings, first Wednesday evening in each month. Annual Meeting, first Wednesday in January. G. H. Sherman, Elgin, Ills. Charles Gentile and P. B. Greene, Vice-Presidents. Gayton A. Douglas, Thomas Markley, and Dr. H. D. Garrison, Executive Committee. F. H. Davies, 88 Walton Place, Chicago, Treasurer and Secretary.

Cincinnati Camera Club.—George Bullock, President. George McLaughlin, Vice-President. Arch. I. Carson, Librarian. T. H. Kelley, Treasurer. W. D. Holmes, Avondale, Cincinnati, O., Secretary.

Cleveland Amateur Photographic Association.—Meets at the residences of the Members, twice in each month, on Monday evenings, at half-past Seven o'clock. Wm. T. Higbee, President. A. H. Hough, 804 Case Avenue, Secretary and Treasurer.

Cleveland Camera Club.—Established January 25, 1887. Meetings held on the first and third Tuesdays in each month at the Club Room, 5 Euclid Avenue. Charles S. Pomeroy, D.D., President. M. Rogers, Vice-President. F. J. Dom and W. N. Yates, Committee. Charles E. Cole, Treasurer. Charles H. Potter, Receiving Secretary. Dr. R. Dayton, 5 Euclid Avenue, Cleveland, O., U.S.A., Corresponding Secretary.

Columbus Camera Club.—Established 1884. Meetings held in Room 40, Pioneer Block. Regular Meetings, at half-past Seven p.m. on third Monday of each month. Annual Meeting, third Monday of December. Rev. George W. Lincoln, President. Professor N. W. Lord, Vice-President. G. W. Lincoln, N. W. Lord, George L. Graham, W. H. Miller, and F. H. Howe, Executive Committee. Frank H. Howe, King Building, Columbus, Ohio, Treasurer and Secretary.

Columbus (Ohio) Amateur Photographic Club.—Established 1884. Meetings the third Monday of each month, at Art School Rooms, 15 East Long Street. Professor A. H. Tuttle, President. Professor Walter S. Goodnough, 101 Hamilton Avenue, Columbus, Ohio, Secretary and Treasurer.

AMERICAN PHOTOGRAPHIC SOCIETIES—*Continued.*

Detroit Photographic Association.—Annual Meeting second Monday in January. Jex Bardwell, President. Albert M. Harris, Vice-President. Judge, J. J. Speed, D. Farran Henry, and Wm. Marratt, Council. William H. Allen, Treasurer. C. W. Earle, Secretary.

German Photographic Society of New York.—Meets at 62 East Fourth Street, on the second and fourth Fridays of each month, at half-past Eight o'clock. Annual Meeting on the fourth Friday in March. Theodor Gubelman, President. Chas. F. Kutscher, Vice-President. L. Nagel, F. Bach, and A. Denniger, Trustees. G. E. Pellnitz, Treasurer. Ludwig Schill, Corresponding Secretary, 839 Broad Street, Newark, N.J.

Minneapolis Camera Club.—Club meets every second Tuesday in each month. Dark room open to visitors at 20 Fourth Street South. R. Cleveland, President. B. Brayton, Treasurer. C. A. Hoffman, 20 Fourth Street South, Minneapolis, Minn., Secretary.

Minneapolis Amateur Photographic Club.—Established 1885. Meetings held at Room 15 Windom Block, the second Monday in each month, at Eight p.m. Annual Meeting in September. A. C. Loring, President. E. R. Shepard, Vice-President. A. C. Loring, R. D. Cleveland, O. W. Meyrowitz, Bishop Brayton, and O. H. Peck, Executive Committee. Bishop Brayton, Treasurer. R. D. Cleveland, 221 Second Avenue South, Minneapolis, Minn., Secretary.

Pacific Coast Amateur Photographic Association.—Established February 19, 1883. Annual Meeting, March 3. Ordinary Meetings are held on the first Thursday after the first Monday in each month at 605 Merchant Street, San Francisco, California. George Tasheira, President. A. J. Treat, Vice-President. Messrs. Clinton, Day, J. L. Cherry, and W. S. Davis, Executive Committee. H. S. Herrick, Room 22, 325 Montgomery Street, San Francisco, California, U.S.A., Treasurer and Secretary.

Pennsylvania Photographic Association.—Established 1870. Time of Meeting, second Tuesday evening of each month, at 1431 Ridge Avenue, Philadelphia, Pa. Hour of Meeting, half-past Seven o'clock. John C. Steinman, President. David Marston and Thomas McCollin, Vice-Presidents. J. G. Hood, J. G. Tyson, and F. Normast, Executive Committee. John R. Clemons, Treasurer. Thomas T. Mahan, 1912 Jefferson Street, Secretary.

Philadelphia Amateur Photographic Club.—Established 1883. Annual Meeting, December Meeting of each year. Stated Meetings, third Monday of each month. Meetings are held in Club Rooms, 907 Filbert Street, at Eight o'clock p.m. Francis A. Cunningham, President. Philip P. Chase, Vice-President. Board of Directors, consisting of twelve members. W. P. Buchanan, Treasurer. Alfred Thompson (Corresponding) and Alfred Clements (Recording), 1311 Butler Street, Nicetown, Philadelphia, Secretaries.

Portland Camera Club.—Frank Woolsey, President. W. F. Woodward, Secretary. W. W. Bretherton, Corresponding Secretary.

Photographic Society of Chicago.—Established 1883. Meets at the Art Institute every month. Professor G. W. Hough, President. Judge Bradwell, First Vice-President. L. L. Charles, Second Vice-Presidents. L. W. Felt, R. P. Harley, and Dr. H. D. Garrison, Executive Committee. H. L. Tolman, Treasurer. C. Gentilé, Secretary.

American Photographic Societies—*Continued.*

Photographic Section of the American Institute.—Established 1859. Meetings of the Section are held at Eight o'clock p.m. on the first Tuesday of each month, and on the third Wednesday of each month except July and August. Annual Meeting on the first Thursday of February. All Meetings are held at the Hall of the Institute, Clinton Place. Henry J. Newton, President. John B. Gardner, Vice-President. Committee of Chemistry and Optics, Committee. Edward Schell, Treasurer. Oscar G. Mason, Photographical Department, Bellevue Hospital, New York City, Secretary.

Photographic Society of Philadelphia.—Established 1862. Stated Meetings, first Wednesday evening of each month, at Eight p.m. Conversational Meetings, third Wednesday evening of each month. Annual Meeting, first Wednesday evening in January, at 1305 Arch Street, Philadelphia. Frederic Graff, President. John G. Bullock and Joseph H. Burroughs, Vice-Presidents. Herbert M. Howe, M.D., Ellerslie Wallace, M.D., and William A. Dripps, Executive Committee. Samuel M. Fox, Treasurer (*pro tem.*). Robert S. Redfield, 1601 Callowhill Street, Philadelphia, Secretary.

Rochester Photographic Association.—Meets on the first and third Monday of each month, at Eight o'clock. Election of Officers, first Meetings in May and November. S. D. Wardlaw, President. S. Miller, Vice-President. Fred. Stone, George Bacon, and Willis Bannister, Finance Committee. Frank Knapp and W. J. Lee, Executive Committee. J. M. Fox, Treasurer. W. H. Learned, Secretary.

Society of Amateur Photographers of New York.—Established 1883. C. W. Canfield, President. Henry J. Newton, Vice-President. C. C. Roumage Treasurer. Clarence S. McKune, 155 West Fourteenth Street, New York, Secretary.

St. Louis Camera Club.—Established 1885. Ordinary Meetings are held on the first and third Monday of each month. The Annual Meeting occurs on the first Monday in April. The rooms of the Club are at St. Louis University, where all journals are sent. Robert E. M. Bain, President. Rev. Charles M. Charropin, S.J., Vice-President. Eliot C. Jewett, J. W. Dunn, Charles M. Alexander, Executive Committee. W. M. Butler, 2636 Osage Street, St. Louis, Missouri, U.S.A., Treasurer and Secretary.

St. Louis Photographic Association.—Established September 14, 1880. No regular time set for Meetings. Meetings called when occasion requires. Gustav Cramer, President. Joseph W. Fischer, Treasurer. Robert Benecke, Superintendent of G. Cramer, Dry Plate Works, Secretary.

The Pioneer Amateur Photographic Club of Brooklyn.—Meets at Eight o'clock, South Oxford Street, Brooklyn, on the first Monday in each month from November to July. Lewis Atkinson, President, Edward Moran, Geo. W. Street, and Gilbert A. Robertson, Committee on Admissions. Dr. Skidmore Hendrickson, 636 St. Mark's Avenue, Brooklyn, Secretary.

Washington Camera Club.—Incorporated May 10, 1888. Edgar Richards President. Philip T. Dodge, Max Hansmann, and D. E. McComb, Trustees S. H. Griffith, M.D., U.S.N., 1707 N.Y. Avenue, N.W. Washington, D.C. U.S.A., Secretary-Treasurer.

CONTINENTAL PHOTOGRAPHIC SOCIETIES.

Association Belge de Photographie.—Established 1874. Dr. Candèze, Liége, President. Baron R. de Sélys-Longchamps and Alex. de Blochouse, Vice-Presidents. H. Colard, A. Rutot, Massange de Louvrex, A. Géruzet, O. Lamarche, Ch. Puttemans, R. Storms, J. Maes, and Herry, Committee. Sections: Anvers, Bruxelles, Gand, Liége. Capitaine L. Massaux, 26 Chaussée de Fleurogate, Bruxelles, Treasurer. Othon Campo, 37 Rue Souveraine, Bruxelles, Secretary.

Dansk Fotografisk Forening.—Established 1878. J. Petersen, President. Chr. Neuhaus, Vice-President. Hilmar Crone, Johannes Petersen, and C. F. L. Galle, Committee. Chr. Neuhaus, Treasurer. C. F. L. Galle, Gothersgade, 15 Kjöbenhavn K., Secretary. The Meetings are held the last Monday in September to April, at Eight o'clock, by Wittmack and Rüse, Holmens Canal 17.

Deutscher Photographen Verein.—Established 29 December, 1876. K. Schwier, Weimar, President. Fr. Müller, München, Amalienstr. 9, Vice-President. C. Kindermann (Fr. Benque & Kindermann), Hamburg, gr. Bleistrasse, 30, and Gg. Brokesch, Leipzig, Zeitgerstr. 2, the Beisitzer. Karl F. Wunder, Hannover, Friedrichstr. 8a, Treasurer. F. Tellgmann, Mühlhausen in Thüringen, Secretary. K. Schwier, Weimar, Corresponding Secretary. Jährlich 1 Wanderversammlung; für 1889, August, in Lübeck.

Internationaler Photographen Verein, 'Victoria.'—Established 1882. H. Dieterich, Guben, President. A. Schulz, Königswalde, Vice-President. Th. Weiss, Guben, E. Berger, Grünberg, R. Ochs, Frankfort-on-Oder, H. Wegener, Freienwalde, Committee. Carl Grall, Guben, Treasurer and Secretary.

Münchener Photographische Gesellschaft.—Established 1879. Franz Werner, President. Otto Perutz, Treasurer. Paul Zschokke, Landwehrstrasse, 31, München, Secretary.

Photographische Gesellschaft, Hamburg, Altona.—Established November 4th, 1873. G. Wolf, Hamburg, President. Th. Petersen, St. Pauli, Vice-President. Herm. Boock, C. W. Lüders, Kunstschleifer, Committee. W. Köhnen, Altona, Treasurer. H. Boock, Bergstrasse, 26. Meets first Tuesday in the month, at 8 p.m., at Gerhafstrasse, 10, Hamburg.

Photographische Gesellschaft in Wien.—Established 1861. Ottomar Volkmer, President. Achilles von Melingo, Vice-President. Carl Angerer, Victor Angerer, Dr. T. M. Eder, Carl Haack, Oscar Kramer, Josef Löwy, Wilhelm Freiherr von Schwarz-Lenborn, Robert Sieger, Josef Szekely, Victor Toth, and Carl Wrabetz, Committee. Ludwig Schrank, Treasurer. Professor Fritz Lukhardt, Secretary. Bureau of the Society, Wien III. Hauptstrasse, 9. Ordinary Meetings are held from October to May, every first Tuesday in the month, in the Rooms of the Kaiserliche Akademie der Wissenschaften. January Meeting is the Annual.

CONTINENTAL PHOTOGRAPHIC SOCIETIES—*Continued.*

PHOTOGRAPHISCHER VEREIN ZU BERLIN.—Established 1863. Dr. Fr. Stolze, President. Dr. F. Stinde and Carl Suck, Vice-Presidents. Paul Grundner, F. Funk, C. Georgi, C. Brasch, and G. Braun, Committee. F. Schüler, F. Funk, Paul Grundner, Albert Schwartz, and Carl Suck, Technical Examination Commission. E. Martini, Treasurer. Albert Schwartz, Luisenstrasse, 23, Berlin, N.W. Meetings on the first and third Thursday in the month, at Kaiserhallen u. den Linden, 27.

SOCIÉTÉ FRANÇAISE DE PHOTOGRAPHIE.—Established 1854. M. Péligot (de l'Institut), President. M. A. Davanne, Vice-President. MM. Davanne (President), L. Bordet (Bibliothécaire), and 17 Members, Committee. M. Audra, Treasurer. M. Perrot de Chaumeux, Secretary. M. E. Cousin, Secrétaire-agent, 76 Rue des Petits Champs.

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[*See pages* 353, 615, 616, 664.

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[*See pages* 51 *to* 58, *and* 858.

H.R.H. THE PRINCESS VICTORIA OF TECK.

Argentotype Print.

From an AT HOME PORTRAIT by W. J. Byrne, Richmond,

On a Kingston Special Dry Plate.

Samuel Fry & Co., Ltd.,
Kingston-on-Thames.

SUMMARY.

While we are not able to chronicle any special advance in portraiture, do we hail with pleasure the gradual merging of the brown and purple tones which have so long held sway into that of a darker and more engraving-like type. It is evident that the public is being educated into this tone of portraiture, and also into dimensions considerably exceeding those previously employed. The facilities now afforded for both taking large direct pictures and also for producing enlargements warrant still further progress in this direction.

Lying dormant since 1865, flash-light photography has this year made astonishing advances. The low price at which magnesium is now attainable has given an impetus to its employment in connexion with quickly-flashing pyrotechnic compounds, and numerous portraits of a really high class have been and are being taken by its agency. But not alone in connexion with other compounds, for it is now a well-recognised means of lighting when the magnesium powder pure and simple is projected through the flame of a gas or spirit lamp flame. This, for winter-evening photography, opens up a field in domestic portraiture which, it is safe to predict, will not remain long untilled.

But rapid photography at night is far more than matched by equal rapidity by day. It is almost apalling to contemplate the number of so-called detective cameras which have been ushered into existence during the year, and still more are announced as coming. In these, some receive their impressions on flexible films, others on plates, and in either case the mechanism for presenting fresh surfaces to the lens is being reduced to a state of the greatest simplicity.

Even assuming, which we do not admit, that cameras of the nature just spoken of partake somewhat of the character of toys, they are invaluable as affording records of transitory scenes which under no other circumstances and by no other appliances could be secured.

But in the more imposing class of cameras the healthy competition that exists has proved the means of a wonderful degree of mechanical ingenuity being laid under contribution in their construction; and while it is unsafe to predict, yet will the recorder of future advances in the realm of camera-dom probably find it hard to beat the record of 1888.

New Societies are springing up in every direction, and this is a most healthy sign, indicating as it does the rapid permeation of our art-science among the masses, and their associating together for mutual improvement.

In printing, one of the leading features of the year has been the introduction, by Captain Pizzighelli, of a method of platinum printing in which the picture acquires its full degree of blackness while still in the

frame exposed to light, thus doing away with subsequent development. This system may be considered as only yet upon its trial.

Not so, however, a new method of preparing paper and developing platinum prints introduced by Mr. Willis. This, which facilitates the production of proofs in platinum, will probably supersede other systems which depend upon the reduction of this metal. It is described in detail on another page.

Since the publication of our article on 'Stereoscopic Photography' in the ALMANAC for 1887, the stereoscope looks as if it were to have another boom. Dormant for a long time previously, numerous articles and communications to Societies have since appeared which give evidence of a lively interest being revived in this charming department of our art.

In optics, while in the mere purely mechanical features of lenses much has been done, such as the more general adoption of the Iris diaphragm system and in that of the Casket system, or the application of several lenses to one mount, advances of a more scientific nature have also been made, *e.g.*, the rectilinear landscape lens of Dallmeyer, a triple 'single' lens by Wray, and a compound objective by Miethe, in which the great capabilities of the new Jena glass are utilised.

Death has, although lightly, placed his finger upon the photographic ranks this year. Norman Macbeth, a well-known artist, who in the evening of life had devoted much of his time to disseminate art principles to photographers, was suddenly removed in the early spring of the year. Marcus A. Root, of Philadelphia, at once a cultured artist, a clever writer, and a photographer of the very earliest times, was removed at a good old age. F. W. Donkin, the secretary of the Photographic Society of Great Britain, during the autumn went with another on a semi-photographic trip to the Caucasian mountains and perished in a snowstorm or fell down a crevasse, thus being cut off in the midst of his usefulness.

Joseph Zentmayer, optician, of Philadelphia, who died in spring, bore a high reputation as a skilled member of his profession, but this was more in the microscopic than in the photographic direction. It was in 1866 that Mr. Zentmayer introduced a photographic objective known by his name, which includes a very large angle of view. It is a doublet composed of two simple crown glass lenses, and of an unusually deep meniscus form.

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IRON PRINTING.

By The Editor.

The principle which underlies printing by the salts of iron was discovered so long ago as 1786 by Scheelé, although in only a limited degree, but mainly in 1840 by Sir John Herschel, who was not content merely with discovering the principle, but devoted himself assiduously to carrying it into active practical effect. This principle actuates some of our most cherished printing processes of the present day, and it may be thus broadly stated :—Certain iron salts, which have no action upon those of other metals, by exposure to light undergo such a change as to render them powerful reducers of those metals to which, previous to such exposure, they were innocuous. This, I say, is the broad principle, and it covers several applications, some of inestimable value.

Narrowing the general into the particular, and confining my remarks for a time to printing by the ferro-prussiate process, let it be noted that this process is based on these facts—first, that the *per* salts of iron (or ferric salts) exercise a different action upon certain substances than that of the iron *proto* salts (or ferrous salts); and, secondly, that the ferric salts become reduced to ferrous salts by exposure to light, in presence of organic matter of course. This principle is exceedingly simple to realise, and it must be borne in mind by all who employ iron methods of printing.

I now proceed to describe some printing processes based on the application of the principle just enunciated.

Ferro-Prussiate or Blue Prints.

It is well known that many photographic processes have emerged from the hands of their originators in such a state of perfection as to leave little room or occasion for subsequent improvement, and this applies largely to the pretty and popular ferro-prussiate one, which, when practised precisely in the state in which Herschel had brought it in 1840, yields results which are in no way inferior to those obtained at the present time, and after an experience with it of forty-eight years. His method consisted in washing paper with the compound salt at that time even known as citrate of iron and ammonia, or one of its congeners, mixing therewith, or applying afterwards, as a developer, potassium ferridcyanide (red prussiate of potash). The print which results from the reaction of the one salt upon the other is in Prussian blue, or more correctly Turnbull's blue, which has a more bright and beautiful colour than the other.

I now give several formulæ as adopted by various successful workers for the production of 'blue prints,' premising, before doing so, that the effective sizing of the paper to be employed has much to do with the brilliance of the print.

No. 1.

A	Ammonio-citrate of iron	4 ounces.
	Water	14 ,,
B	Ferridcyanide of potassium	2½ ,,
	Water	15 ,,

Take equal parts of A and B, filter, and coat the paper with a broad camel's-hair brush. Dry quickly.

No. 2.

A	Ammonio-citrate of iron	1 ounce.
	Water	2½ ounces.
B	Ferridcyanide of potassium	2 ,,
	Water	16 ,,

Mix, as above, one part of A to two parts of B.

No. 3.

A	Ammonio-citrate of iron	64 grains.
	Water	1 ounce.
B	Ferridcyanide of potassium	48 grains.
	Water	1 ounce.

Mix equal parts of A and B.

No. 4.

A	Ammonio-citrate of iron	2 ounces.
	Water	8 ,,
B	Ferridcyanide of potassium	1¼ ounce.
	Water	8 ounces.

Equal parts of the foregoing.

I might go on giving formulæ on formulæ as employed by different makers, but it would serve no good end; enough are here presented to show in what variety the proportions may be mixed. In most of them the proportion of ammonio-citrate may be increased when the negatives are very intense, or when greater intensity in the prints are desired. The sizing of the paper exercises a great influence upon the character of the prints. At a loss on one occasion for paper of a suitable nature with which to produce some blue prints, I took a sheet of salted albumenised printing paper, and, having allowed a jet of steam to play on it for half a minute, I immersed it in boiling water to complete the coagulation of the albumen and dissolve out the chloride with which it had been salted. The boiling water would, however, have effected both these ends without the steam. I then, with a pad of Canton flannel, applied the iron sensitising solution, prepared according to the foregoing directions, and dried it quickly. This yielded the most brilliant prints of this class that I have yet seen.

Great brilliance may also be secured by resizing the paper, sponging it over with arrowroot prepared in a manner similar to that of making

starch, viz., rubbing it up with a little cold water, and then pouring boiling water upon it.

Ammonio-Ferric Oxalate.

In the foregoing formulæ the two solutions are mixed before being applied to the paper, and this is doubtless the most convenient way of proceeding. But the A in these formulæ may also be applied by itself, and after removal from the printing frame the image may be developed by immersion in B. When this method of proceeding is desired, another iron salt than the ammonio-citrate has in my hands invariably answered better. I allude to the ammonio-oxalate. The former, being an article of commerce everywhere, can be purchased in every town and village in which there is a druggist's shop, under one or other of the names, ancient and modern, by which it is known—such as citrate of iron and ammonia, ammonia citrate of iron, double citrate of iron and ammonium, or ammonia ferric citrate. But the oxalate of iron and ammonia is not so commercially available, and one must prepare it for himself. This is how I do it:—

Purchase or prepare hydrated peroxide of iron. If you prefer preparing it yourself proceed thus:—Mix six fluid drachms of sulphuric acid with ten ounces of water, and in this, with the aid of heat, dissolve eight ounces of protosulphate of iron. Then add half an ounce of nitric acid diluted with two ounces of water. Now boil, and when the liquid passes to a red colour add ammonia until the iron is precipitated as a peroxide. Wash with boiling water and preserve in a bottle in the moist state.

Having the peroxide of iron, we are now ready to proceed with the preparation of ammonia oxalate of iron. Take of—

Crystallised oxalate of ammonia	437 grains.
Oxalic acid	386 ,,
Water	6 ounces.

Place these in a porcelain vessel and apply heat, somewhat under the boiling point, and then slowly stir in peroxide of iron to saturation.

The same end can be attained by neutralising an ounce of oxalic acid (in aqueous solution) with ammonia, adding another ounce, and digesting the mixture with peroxide of iron.

Some chemists strongly urge the propriety of keeping the ammonio-ferric oxalate thus prepared in solution, keeping the bottle covered over with opaque paper, alleging that it will decompose if crystallised. But I can speak positively from a personal acquaintance with it that if it be crystallised by evaporation in the usual way in a room somewhat dimly lighted, the beautiful green crystals thus obtained will keep good for a long time provided they are kept away from the light, which would turn them yellow by the formation of the protoxalate.

Oxalate of ammonia is an ingredient in the formula last given. It is

easily made by making a saturated solution of oxalic acid in warm water, the quantity being of no consequence, and then adding just enough ammonia to neutralise the acid, afterwards evaporating to dryness.

Printing by Development.

Here is one way, among others, in which I have employed the ammonio-ferric oxalate with excellent effect:—A sheet of paper is brushed or sponged over with a sixty-grain solution of the salt. When dry this paper may either be used immediately, or it may be placed away in a dark case, in which it will remain good and ready for use for several months, and even years. A brief exposure under a negative in the printing frame impresses it with a barely visible image, to bring out which in its full vigour all that is necessary is to immerse it for a few seconds in a solution of ferridcyanide of potassium of no particular degree of strength. A rinse in water suffices to fix this picture.

Synonyms.

I have given synonyms for one of the salts employed in the foregoing formulæ; it now remains that I do so likewise for the other—the A in the series.

The ferridcyanide of potassium, originally designated ferrosesquicyanate and ferrosesquicyanuret of potash, is now very generally known as the red prussiate of potash, to distinguish it from the ferrocyanide, or yellow prussiate, which is of no use in the process of printing now being treated of. It is further known as ferricyanide, which many very properly dislike on account of its similarity in sound to ferrocyanide, and which is apt to lead to confusion; further, according to the present system of giving the base the first place in chemical nomenclature, it is known as potassium ferricyanide. Ferridcyanide is the term employed here by preference.

The Use of Ammonia with Ferric Salts.

The question will probably have passed through the reader's mind ere now, Why employ an *ammonio*-ferric salt instead of the simple ferric salt itself, and what has ammonia to do with the reactions that take place? The ferric salt, the peroxalate for example, with which the paper is imbued, is very soluble in water, while the protoxalate produced by the action of light is comparatively insoluble. But the persalt when in solution possesses the property of dissolving the protosalt to an extent sufficient to weaken and seriously damage the newly formed and still almost latent print, as regards its future brilliance. This can be obviated by either of two methods: the one is to combine ammonia with the persalt; the other being to wash the print, upon removal from the printing frame, with oxalate of ammonia. The former of these methods is that which it is found most convenient to adopt in practice.

Toning.

Previous to proceeding to other systems of printing by the salts of iron, it will be well to indicate means by which the blue prints obtained by the foregoing processes may be toned and made to assume different colours. Herschel indicated several substances by which this was effected, but his experiments in this direction, although suggestive, were not exhaustive.

A very beautiful violet tone is imparted by immersing the prints in a greatly diluted solution of ammonia, but, unfortunately, the tone thus obtained is evanescent. This kind of toning may even be effected by holding a print over an open bottle of ammonia, or over a flat dish on which a few drops have been sprinkled.

Brown tones are obtained by immersing the prints in water, in which a small piece of caustic potash has been dissolved. They soon assume an orange colour, when they must be washed in plain water, and then be transferred to a five or six-grain solution of tannin, and allowed to remain until they acquire the desired dark tone, when they are removed and washed.

Sepia tones are obtained by taking the prints, when they have arrived at the stage last indicated, and immersing them in a solution of potash or soda, taking care not to allow it to act too long.

A darker brown than that described is obtained by immersing for five minutes in—

Tannin	1 drachm,
Water	4 ounces,

and afterwards transferring to—

Carbonate of soda	1 drachm,
Water	5 ounces,

changing them back to the tannin solution (with intermediate washing) after remaining about a minute.

A green tone, useful for some purposes, is given by immersing in—

Sulphuric acid	1 drachm.
Water	16 ounces.

The blue colour originally obtained may be intensified by immersing in

Sulphuric acid	1 ounce.
Saturate solution protosulphate of iron	1 ,,
Water	1 ,,

Or in—

Acetate of lead	½ ounce.
Water	2 ounces.

Dr. Lagrange's method of converting a ferro-prussiate and citrate of iron print into a black print is to float the print for a short time upon a

weak nitrate of silver bath, which makes it almost entirely disappear. He then removes the print and washes out all the free nitrate, then brings it back as a black picture on a white ground by placing it in a bath of ferrous oxalate.

Processes with Ferric Chloride.

The chlorides, equally with the citrates, oxalates, and tartrates of iron, possess important photographic properties.

In all the foregoing processes it is the parts which have been exposed to the light that ultimately become blue, but I am now to describe one in which quite a contrary effect is produced; that is to say, the parts protected from light become blue, the exposed portions being white, and on this account it is the process *par excellence* for reproducing the plans of architects or engineers, whether civil or military. Although discovered by Herschel it has been much improved in detail by others, in particular by M. Henri Pellet, of Paris, whose method is that which, subjected to slight modification, is now universally adopted for the purposes mentioned. I subjoin several types of Pellet's formulæ, taken from his patent specification of ten years ago, and it will be observed that his proportions are given—the liquids in cubic inches, and the solid substances in drachms (avoirdupois). The strength of the perchloride of iron is given according to the Beaumé hydrometer, doubtless on account of the difficulty that would be experienced in otherwise estimating it, for although the salt exists in the solid form it deliquesces with considerable rapidity, forming a syrupy fluid, in which state it cannot be weighed with facility or accuracy. In a publication by the Indian Government the solution recommended by Pellet—45° Beaumé—is stated to contain 47 per cent. of the anhydrous salt, and to have a specific gravity of 1453 at a temperature of 60° Fahr.

No. 1.	Perchloride of iron at 45° Beaumé	½ cubic inch.
	Oxalic or nitric acid	3½ drachms.
	Water	6 cubic inches.
No. 2.	Perchloride of iron at 45° Beaumé	$\frac{9}{10}$ cubic inch.
	Citrate of soda or of potash	4½ drachms.
	Water	6 cubic inches.
No. 3.	Simple or ammonical citrate of iron	2¼ drachms.
	Water	6 cubic inches.

These three types of the liquor or the solution may be mixed; the proportions of the substances specified may also be varied.

To these solutions dextrine, gelatine, gum, isinglass, albumen, glycerine, and other similar substances may be added, for the purpose of thickening them.

No. 4. Perchloride of iron at 45° Beaumé ...	$\frac{4}{10}$ths of a cubic inch.
Water	6 cubic inches.

The surface of the article or object upon which the direct reproduction is to be effected is first impregnated with the solution of the type or types selected, and then placed in an alkaline bath, when the peroxide of iron will be deposited. The surface is then rendered sensitive, either immediately or after drying, by solutions of citric or oxalic acid, which may be thickened, if desired, by the addition of any one or more of the substances above specified.

No. 5. Citric or tartartc acid........................	4 drachms.
Perchloride of iron at 45° Beaumé ...	$\frac{4}{10}$ths of a cubic inch.
Ammonia (in variable quantities, according to the proportion of the substances employed).	
Water	6 cubic inches.

The liquor or solution, according to this last formula, may, however, vary and be thickened, as above mentioned.

The surface of the article or object upon which the direct reproduction is to be effected is impregnated with it, and the process is then continued in the following manner :—The sensitive surface of the paper, for example, is exposed to the light underneath a tracing, the drawing on which is to be reproduced, or underneath a piece of lace or other object, as the case may be, placed in a bath of a yellow prussiate. The parts corresponding to the black lines on the tracing, for example, become blue, and the parts exposed to the light remain white. The surface is then washed and placed in a bath composed of dilute acids, and then rubbed with a brush or plug of cotton. The blue colour which was formed by the preceding operations will stand out clearly on the white ground of the paper; the surface is then washed and dried. The paper may be previously coloured.

For taking out false lines or marks an ink or liquor is employed, containing—

Oxalic acid	11¼ drachms.
Carbonate of potash .... about	10 ,,

This ink or liquor should be acid, and it may or may not be thickened.

The foregoing is almost exhaustive, and leaves little more to be said. However, as it is well to see how others than the patentee carry out the idea, the following formulæ are subjoined, and in these different standards of measurement are employed.

Perchloride of iron	616 grains.
Oxalic acid	308 ,,
Water..	14 ounces.

Not only may these proportions be varied according to the quality of the paper to be employed and the sensitiveness desired, but the oxalic acid may be replaced by tartaric, citric, and other vegetable acids. Gelatine, gum, dextrine, or similar substances, may also be added to make amends for any lack of body in the sizing of the paper that is to be coated. Whichever acid be employed, a suitable proportion is found to be twice as much perchloride as there is acid, and some manufacturers of the paper add about twice as much gum as there is perchloride, preferring also to add a small quantity—say two-thirds of that of the acid—of chloride of sodium.

Coat the paper with this, dry and expose in the printing frame under a drawing or transparency. An exposure of at least one minute in the sun will be necessary. Develop by floating on a saturated solution of ferrocyanide of potassium (the yellow prussiate of potash) for one or two minutes, then wash in plain water and immerse for ten minutes in a three per cent. solution of sulphuric acid, followed by a final rinsing in water. The colour of the blue is very deep and rich.

ANOTHER.

Citric acid	40 grains.
Perchloride of iron	48 ,,
Gum arabic	42 ,,
Water	11 ounces.

The paper is coated twice with the above solution, and after removal from the printing frame the prints are developed by floating on a twenty-grain solution of ferrocyanide of potassium.

Here is yet another, differing slightly from the preceding :—

A.	Gum arabic	20 parts.
	Water	100 ,,
B.	Perchloride of iron	50 parts.
	Water	100 ,,
C.	Ammonio-citrate of iron	50 parts.
	Water	100 ,,

Mix these in the following proportions :—

A	20 parts.
B	6 ,,
C	8 ,,

Before coating the paper allow the mixture to stand for a little until it becomes quite fluid, as it thickens when first mixed. The prints are developed by being floated on a rather strong solution of ferrocyanide. Twenty per cent. strength has been recommended by Pizzighelli. After rinsing in water it is immersed in dilute hydrochloric acid, again rinsed in water and dried.

Pigment Printing by the Salts of Iron.

In the following process of Poitevin's the colour of the picture may previously be determined by the operator, for it is essentially a pigment process.

Make a solution of gelatine (1 to 15), with which any desired pigment of any colour is well mixed, and having poured it into a flat dish, float paper upon it while it is warm and fluid. After being dried, sensitise in—

Perchloride of iron	240 grains,
Tartaric acid	72 ,,
Water	5 ounces,

and dry in the dark. Print under a transparency, and develop by immersing in warm water.

The rationale of the action in this process is as follows :—Perchloride of iron renders gelatine insoluble, but exposure to light reduces the ferric chloride to the ferrous chloride; hence, those parts shielded from the light remain insoluble, while the portions on which light acted have their solubility restored, and are dissolved away in the hot water. In copying plans or tracings this process gives black (or any other colour) lines on a white ground.

Obernetter's Ferro-Cupric Process.

There is an iron process by the late Dr. Obernetter which is but little known, but which, in my opinion, deserves to have attention more forcibly directed to it. By its agency prints can be obtained which rival silver ones in appearance, and I think they may be considered as fairly stable if I judge by one which has been exposed on the chimney-piece of my office for many months without protection of any kind whatever. Obernetter discovered it, or, more correctly, worked it out, in the laboratory of Albert of Munich, over twenty-four years ago.

Float well-sized paper for two minutes upon—

Solution of perchloride of iron (Sp. gr. 1·5 to 1·6)	13 parts.
Hydrochloric acid	12 ,,
Crystallised copper chloride	100 ,,
Water	1000 ,,

This paper will keep well before, but not after, exposure.

Expose in the printing frame till a very faint image is visible, and within an hour at the farthest develop by floating the paper for three or four minutes upon—

Sulphocyanide of potassium	10 parts.
Sulphuric acid	1 part.
The above sensitising solution	10 to 20 parts.
Water	1000 parts.

Cyanide of copper is precipitated upon the image. The paper may now be immersed for several minutes. Now remove and wash for a quarter of an hour or more. The image, as just stated, consists of cyanide of copper, which is susceptible of several changes. For example, if a red tone is desired, the proofs are immersed in a six to twelve per cent. solution of ferridcyanide of potassium. The strength of the tone depends upon the duration of the immersion.

The tone of silver prints is given by immersing them in—

Perchloride of iron	40 parts.
Hydrochloric acid	80 ,,
Protosulphate of iron	100 ,,
Water	200 to 300 parts.

The tones assumed by the prints when in this bath are first red violet, followed in succession by purple, blue violet, black, and greenish black. This last colour changes to that of a well-toned silver print by the next process, which consists in washing them slightly, and immersing them for a few seconds in a very dilute solution of acetate of lead. But if this tone is not desired it is only necessary to remove them from the iron toning bath above described as soon as they have acquired any required tint, wash in acidulated water and dry. If desired, the prints may receive a coating of albumen by first drying them and then floating upon albumen which is afterwards coagulated by heat.

The various reactions in this process are as follows:—Upon the paper there is perchloride of iron, and an excess of chloride of copper. The light reduces the perchloride to protochloride (ferric to ferrous chloride), the copper chloride undergoing no change. If the print is at this stage kept dry no change takes place, the picture remaining latent; but if the atmosphere be moist the protochloride of iron attracts humidity, and is decomposed in such a manner that perchloride of iron and protochloride of copper are simultaneously re-formed, the paper reverting to its originally sensitive condition, and ready for being again exposed. But if, previous to time being allowed for this to take place, the proof is immersed in sulphocyanide of potassium, insoluble sulphocyanide of copper is rapidly precipitated upon the reduced parts; while upon the parts not reduced soluble sulphocyanide of copper is formed, but is immediately dissolved by the sulphocyanide of potassium in excess, and decomposed by contact with water, yielding insoluble sulphocyanide of copper, which is deposited upon the parts already covered with this salt. A yellow appearance of the print indicates the formation of a sulphocyanide and double cyanide of copper, but this disappears in the washing, as this salt is decomposed by water yielding insoluble sulphocyanide of copper. The red colour of the print is owing to its transformation into ferrocyanide of copper, the violet colour to a partial formation of Turnbull's blue.

THE PLATINOTYPE.

This is the iron printing process which of all others is most practised at the present day. In designating it an iron process do not misunderstand me as meaning that, as in the more purely ferrotype or ferroprussiate processes here described, iron or any of its salts find a place in the finished print, but only that it is the means to the end. Platinum is one of those metals, the salts of which can be reduced by certain salts of iron, in accordance with the principles already stated—a principle that actuates silver and other metals as well as platinum. But the platinum process, as practically worked out and introduced by Mr. Willis, is so admirable in its theoretical details, and yields prints of such beauty and permanence, as to isolate it from all other 'iron' processes, and to render a more special reference not only excusable but necessary.

I remember when, at the Dublin meeting of the British Association in 1878, I read a paper by Mr. Willis on this subject before the chemical section, an objection was started by one speaker to the effect that it was only one of the numerous processes discovered many years previously by Sir John Herschel—I took occasion to say that if Willis's method had consisted merely of applying a wash of chloride of platinum to a semi-latent image obtained by exposing to light a paper sensitised with ammonio-citrate of iron, then would there have been some force in the objection, but that as regarded the carrying out of the general principle into all details of practical operation there was a wide distinction between the two. Even such a skilful experimentalist and learned chemist as Carey Lea, when Willis's process was first announced, wrote that it would need much care and experimenting to get permanent pictures by that process, adding, 'When the iron salt is developed by silver, the print will need fixing with hyposulphite, and it suffers very much in the fixing bath. Some years ago I made hundreds of prints in this way, trying to get a satisfactory result, but I did not get one that was altogether so. As regards pictures formed of platinum, although it is so permanent a metal, it does not seem to be certain that they will share its permanence. Hunt says (*Researches in Light*, second edition, page 153), "Nearly all the platinotypes, however, slowly fade in the dark." He also mentions that some of his platinum prints became converted by time from positives into negatives. In another case the pictures disappeared, but were found to have printed themselves off on silver prints lying next them. Mr. Hunt also experimented on the action of ferrous oxalate in connection with platinum solution, but did not obtain any satisfactory results.' Seeing, therefore, that such were the characteristics of Herschel's method as carried into effect by his friend and collaborateur, Professor Hunt, it will be seen how well justified I was in saying on the occasion referred to that there was a wide distinction between the two processes—that of Herschel and that of Willis.

The Hot Development System.

The platinotype process depends on two reactions, both of them discovered by Mr. Willis :—

1st. The necessity for the use of potassic or other oxalates as developers, or rather as aids to the reduction of the platinum salt by the ferrous image formed by light.

2nd. The use of platinous salts in which the platinum is combined with only two atoms of chlorine ($Pt\ Cl_2$) instead of the platinic salts in which the platinum is combined with four atoms ($Pt\ Cl_4$).

The process itself is now to be described, not necessarily in full detail, but sufficiently so to enable its principle of action to be clearly understood.

Paper is washed with a mixture of ferric oxalate and potassic platinous chloride, made by dissolving sixty grains of the platinum salt in one ounce of the iron solution. This mixture keeps good for only a short time, and must, therefore, be applied to the paper within, say, a quarter of an hour after its admixture. It may conveniently be spread by means of a small pad of cotton wool enclosed in flannel or gauze, the paper being kept quite flat upon a slab of glass. From 25 to 30 minims are required to coat a 10×8 sheet of paper, and from this may be deduced the quantity necessary for sheets of larger dimensions. After being dried, it is of importance that the paper be kept so, a convenient means for effecting this end being a close tube containing chloride of calcium and asbestos, which, by absorbing any atmospheric moisture in the tube, ensures the paper remaining dry.

In printing, which is done in a printing frame in the same manner as albumenised paper, if the atmosphere be quite dry no precaution is required ; but if moist, then is it desirable to superimpose a sheet of thin indiarubber cloth on the paper to protect it from the action of the atmosphere during printing.

As in other iron processes previously described a rather faint image is produced by exposure to light, arising from the ferric being reduced to the ferrous oxalate of which this visible image is composed. Although the proof is but feeble, yet it is of a nature sufficiently pronounced to enable a decision being arrived at relative to the progress of the printing. When done the print must be again transferred to a dry place until all the printing is done, when the proofs undergo the next operation, the nature of which I will explain by a little recapitulation. On the print we have now got both ferric and ferrous oxalate in intimate mechanical union with the platinum salt. The ferrous salt forming the impressed image is capable of reducing the platinum salt in contact with it only when the two salts are brought into contact with potassic oxalate, as before described. But the ferric unaltered salt has no action on the platinum salt

when so treated; therefore all that is necessary is to immerse the paper in a solution of this salt, when almost simultaneously the ferrous oxalate dissolves, and in doing so at once reduces the platinum salt lying in contact with it, and this in proportion to the stage to which the production of the ferrous salt was carried by the exposure to light under the negative. Where any portion was protected from light by the negative, there does the ferric salt remain unaltered, no reduction of the platinum taking place; but where, on the contrary, the light was allowed to exercise its full action, so is its conversion into the ferrous salt demonstrated by the copious reduction of the platinum as a black pigment, which is really metallic platinum in a state of fine division.

All chemical action being accelerated by heat, the developing solution is warmed previous to the immersion of the prints, hence the term 'hot development,' as now applied to this operation, in contradistinction to cold development more recently introduced. The print acquires its full vigour after it remains in contact with the potassic oxalate solution for a few seconds, a more prolonged immersion not bringing out any more details.

It only remains to remove the ferric oxalate and the print is finished. This is effected by immersion in one or more changes of greatly dilute hydrochloric acid, which dissolves it out leaving the image unaffected.

To produce platinotypes having a beautiful brown tone the following has been recommended by a Swiss experimentalist, who says :—If a solution of mercuric chloride be added before developing to a hot potassium oxalate solution, the platinum print will have a very beautiful brown tone. Solution A consists of 295 grammes potassic oxalate in 1000 grammes of water; solution B of 5 grammes of mercuric chloride in 100 grammes of water. Warm solution A to about 70° or 80° C., then add solution B to it. The operator can at pleasure convert the ordinary greyish tone into brown or even sepia.

Before leaving this subject we may observe that up to the time of Willis's application of platinous salts no other use of them had been made in any department of industry. And *apropos* of these, as contrasted with platinic salts, only half the work has to be performed by the ferrous oxalate, and half tones are thus obtainable, instead of the black, deep shadows which would result if platinic salts were used.

It may here also be well to place upon record the fact that at the time the preparation of what I believe to be the first article on the subject (which appeared in the pages of THE BRITISH JOURNAL OF PHOTOGRAPHY about sixteen years ago), I was shown by Mr. Willis several test-tube experiments since repeated elsewhere.

Into each of these test-tubes he placed a little ferrous oxalate. Into the first tube he poured a solution of silver, into the second a solution of gold chloride, and into the third a solution of platinum chloride. 'You will notice,' said he, 'that a very rapid reduction of the metals takes

place in the tubes containing the salts of silver and gold, but no trace of reduction in the third tube containing the salt of platinum. Even on boiling the ferrous oxalate in contact with platinum chloride little or no reduction takes place,

At that time (1873) he was greatly puzzled by the obstinacy with which the metal refused to be reduced from the platinum chloride. After a time he came to the conclusion that could the ferrous oxalate be dissolved in some solvent, reduction of the platinum chloride would be effected. His efforts to find this were unsuccessful until a note by a French chemist led him to try the neutral oxalate of potash. He had to make this salt, as it could not then be procured in London. On trying this salt his expectations were realised, and the platinum was instantly reduced. And when into a tube containing ferrous oxalate a solution of potassic oxalate was placed, on heating the solution the ferrous oxalate was dissolved, and on dropping into the warm solution some platinic chloride, platinum black was thrown down.

This experiment shows that the ferrous salt, which by action of light is formed on paper which has previously been coated with ferric oxalate, if formed in larger quantities by chemical means and then treated in a test-tube in the manner described, is capable of reducing a salt of platinum. The problem, then, was to find out how to make the reaction take effect, not only in a test-tube, but on paper which bears a ferrous image, and to secure so rapid a reducing action that the platinum shall be reduced by the image before the latter has been dissolved away by the liquid applied. It was by a test-tube experiment identical with the one just described that the possibility of inventing a platinum printing process first presented itself. 'Indeed,' writes Mr. Willis subsequently, 'before my test-tube was cool, more than one method of working suggested itself. A note is well placed here. I have suggested that the use of the potassic oxalate is merely as a solvent of ferrous oxalate, and this is the view I undoubtedly held at the time this experiment was made. But I am convinced that this is not its only office; it is, *per se*, a reducing agent, and it very probably acts in increasing the reducing action of the ferrous salt.'

These memoranda may be of use to some future historian of this department of photography.

Cold Development Process.

In the process just described, the platinum salt was applied to the paper as one of the ingredients with which it was prepared. In that which is now to receive consideration there is no platinum in the paper, which is prepared by being coated with ferric oxalate to which has been added a minute quantity of a salt of mercury (the chloride), in the proportion of about one to one and a quarter grain to the ounce of ferric

oxalate solution. Paper so prepared keeps good for a long time. It is now ready for exposure in the printing frame.

The developing solution consists of from thirty to one hundred and twenty grains of oxalate of potash, and from five to fifteen grains of potassic chloro-platinite. It will be seen that there is considerable latitude allowable in the composition of this developer as to proportions, but nine grains of the platinum salt may be considered an average strength to each ounce, that of the oxalate may be varied within the proportions above given. The development proceeds slowly, and it may be stopped at any desirable stage.

If warm tones are wanted, the proportion of oxalate in the developer must be small; cold tones are obtained by increasing the proportions of the oxalate. Fifty grains per ounce may be considered a good average strength. It is recommended that in order to prepare the developer in an easy manner, a good plan is to keep stock solutions of the oxalate of potash and of the platinum salt. A good strength for the former is one pound of the salt dissolved in fifty-four ounces of water, and for the platinum salt fifty-six grains dissolved in one ounce of water.

Of the many methods of applying this developer, perhaps the most generally useful is by floating. The print is floated in the manner usual with platinotype prints, and it may be allowed to remain floating on the surface until complete development has been effected; but it is preferred to remove the print as soon as it has been well wetted, and then to hold it in the hand, carefully watching the progress of development until the right point has been reached, when it is immediately plunged into the acid clearing bath. Instead of holding it in the hand, it may be laid on a piece of glass, or other convenient support, and then, by means of a brush wetted with the acid clearing solution, the latter may be applied to any parts which it may be advisable to prevent from reaching their maximum intensity.

For very large prints, the best and most economical arrangement is to apply the developer by means of flannel-coated rollers. The developer may also be applied very well by means of a spray producer, or it may be brushed on by a camel's-hair brush.

The acid clearing solution consists of about one drachm of hydrochloric acid to the pint of water. Its function is to clear and brighten the print.

Pizzighelli's Printing-out Process.

This process differs from those previously described in being one which is printed-out in the frame, the exposure being carried on until the print acquires its full depth. The paper is prepared by being heavily sized and treated with the sensitising solutions already described, to which is added the developer. Moisture is a condition of success during

exposure, in the absence of which the printing will be slow and irregular. The best and most stable conditions for the preparation of the paper scarcely having been determined upon as yet, it is considered better to defer entering with fulness into the subject at this time.

Some Reactions of Ferric and Ferrous Salts.

It is considered desirable here, for the benefit of any who choose to make research into the still only partially explored field of iron printing, to summarise the reactions of the ferric and ferrous salts as given in some of the latest works on inorganic chemistry.

Ferric Salts.—Caustic fixed alkalies and ammonia give foxy-red precipitates of ferric hydrate, insoluble in excess. The carbonates behave in a similar manner, the carbonic acid escaping. Hydrogen sulphide gives a nearly white precipitate of sulphur and reduces the sesquioxide to monoxide. Ammonium sulphide gives a black precipitate, slightly soluble in excess. Potassium ferrocyanide yields Prussian blue. Tincture or infusion of gall nuts strikes a deep bluish black with the most dilute solutions of ferric salts.

Ferrous Salts.—Caustic alkalies and ammonia give nearly white precipitates, insoluble in excess of the reagent, rapidly becoming green and ultimately brown by exposure to air. The carbonates of potassium, sodium, and ammonium throw down whitish ferrous carbonate, also very subject to change. Hydrogen sulphide gives no precipitate, but ammonium sulphide throws down black ferrous sulphide soluble in dilute acids. Potassium ferrocyanide gives a nearly white precipitate, becoming deep blue on exposure to air; the ferridcyanide gives at once a deep blue precipitate.

Since the foregoing was written, and even while these pages are passing through the press, I perceive that patents are being taken for new processes based on the action of light on iron salts. The nature of these cannot yet be ascertained.

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PORTABLE METEOROLOGY.

By C. Piazzi Smyth (Late Astronomer Royal for Scotland).

Next to the pleasure of watching eagles soaring in the sky, and performing round after round in the wide empyrean, with calmly outstretched wings, where each single quill feather towards their extremities stands out clear, distinct, steady, against the cerulean blue; or the similar pleasure of gazing in wonder at the mighty albatross, careering under a leaden sky through the storms of the Southern Ocean, slowly inclining perhaps, sometimes to one side, and sometimes to another, with its more than eagle's length of wing, but otherwise impassively floating through the air, without vulgar flapping, or any visible effort, and yet overtaking the most clipper ships ever built by art and man's device for sea-going speed; next, I say, to those natural wonders, which are so much of mysteries still, is the feeling with which I watched the other day a prince of cyclists, mounted on none of your double patent safety tricycles, with all manner of low supports and broad bearings to prevent a clumsy rider ignobly tumbling off, but raised on high on an enormous forewheel of a genuine bicycle of the olden type.

He was returning from a successful country excursion; his seat was easy, his position upright, as it should be for man born to contemplate the heavens as well as the earth, and he scarcely disturbed himself to do more than gently touch, with one foot or the other, the treadles of the machine when they came up towards him; yet away he went, without, as it seemed, appropriate impulsive force, or sufficient reason, or any sure support, along the smoothed road; passing without effort, on a uniform line, not only the most diligent foot-passengers (with all their bobbing up and down when their heads are seen over an intervening wall), but carriages and horses of the most fussy description as well.

And that man was a photographer, with a neat little detective camera strapped on to the framework of his spider-like engine, and capable, doubtless, of taking an instantaneous picture of anything that should happen before him on this earth's surface, and donating the future, as well as the present, population of the world with copies large and copies small, copies on glass and copies on paper, of some rare scene or wonderful event of which he alone had been a privileged witness. Yes, he can do all this, if only the atmosphere should not be raining heavily and pertinaciously at the time. For then, why, then, the poor man perched up on his tall, unprotected wheel, and with his limited wardrobe, cuts a very different figure indeed.

'But why did he go out on such a morning and in such an exposed style,' demands a sturdy resident of the place, comfortably wrapped up in mackintosh or greatcoat and comforter, and with the inevitable umbrella, 'when all the meteorological instruments were threatening a preternatural downcome of rain?'

The answer is, simply, that the thoroughly soaked one, spite of his powers of wonderful, noiseless, gliding locomotion, like a swallow on an invisible line, knew nothing about what nature was preparing for his confusion. For how could he carry about the world with him a whole fit-out of a supposed complete meteorological observatory, and be continually observing and reasoning on his observations of many instruments, but, above all, of that most exacting of all of them, that most

curious, most delicate, most touchy affair, the wet and dry-bulb hygrometer, and yet the one most directly concerned in predicting either a dry or wet day, and throughout the summer, or tourist season of the year, more particularly?

For the foreseeing of raging winter storms there is nothing like the barometer, and that, in the aneroid form, has been made as portable as you choose. The thermometer also has long been prepared for those who like it so, as small as you please. But who can condense into portability that refractory thing, the wet and dry-bulb hygrometer, intended to test the amount of invisible moisture in the air, and therewith ascertain whether the said air is just then requiring to gather more moisture to keep itself up to its proper standard, or has so over-gorged itself already that it can hardly refrain any longer from letting the overplus fall as rain? No one, in fact, has ever tamed that cross-eyed, spoiled, crooked child of meteorological physicists, and been able to secure with it, when in very miniature form, really trustworthy observations of its kind and on the required occasions of instant need.

Yet what the *psychromètre of M. Auguste*, as some persons will mincingly and provokingly insist on calling that hygrometer, is totally unable to accomplish, 'the rain-band spectroscope' performs most charmingly and satisfactorily.

It may be made no bigger than a silver pencil-case; it wants no preliminary preparation; it can be taken out of the pocket at a moment's warning; and a single moment of looking at an appropriate part of the sky, viz., low down, and at any time all through the middle of the day (with a slight correction depending on a merely approximate knowledge of the temperature), will tell exactly how that mystery of mysteries is going on in the upper air above the clouds, viz., the quantity of invisible vapour of water stowed away in the inter-spaces of the ultimate molecules of the dry gases of the atmosphere.

I myself had lately made some heavy preparations before coming out to a little country place (where weight was no objection) to establish wet and dry-bulb hygrometers of superior kind, registering continually both their maxima and minima throughout the twenty-four hours, and to build a well-protected, but also ventilated, house for them in a garden. But as I am no meteorologist for the sake of meteorology, and desire only to know the probabilities of coming weather for private practical purposes, and as I find, in the clear air of a rural scene in Yorkshire, far away from great smoky cities and dark manufacturing towns, that the tiny pocket-spectroscope does that better than the most hideously unportable wet and dry-bulb hygrometer compound arrangement ever constructed, can I be blamed for letting the latter, at the eleventh hour, go by the board?

At all events I would not recommend one to any travelling cyclist on any account, to occupy his time and burden his light machine. But let him rather adopt that exquisite little optical invention, the rain-band spectroscope, and how he will be watched with wonder along the road every time he looks through it!

'What can he see with so small a telescope?' the passers-by will ask, and yet it is no telescope at all, but a microscope, employed in examining the physical constitution of the light of heaven between the jaws of a metal slit, narrowed down to all but extinction. And if he leaves the instrument perchance on the table for a time at any hotel where the

waiters are of rather an inquiring turn of mind, ten to one he finds, on returning, that the slit has been opened to its utmost possible width, and the instrument peered through, but in vain! in vain! So that those who have not entered by the orthodox door of knowledge, but have sought to climb up by some other, though nefarious, way, are more puzzled than ever as to what good the photographic cyclist can gain from such a very little thing, but he will go on his way rejoicing.

COLLODION EMULSION NOTES.

By W. B. Bolton.

There appear to be many minor points in the preparation of collodion emulsion plates which give rise to more or less trouble and uncertainty in the hands of those who are new to the process. The following notes therefore, owing to the wide circulation the Almanac will secure for them, may prove useful to a larger class than I could otherwise reach. I may premise that the remarks apply to no particular 'make' of emulsion, the methods and formulæ being equally available with the different sorts of my own manufacture or any other good sort.

Cleaning and Preparing the Glass.

This, though an important, is not the troublesome operation that many make it. It is of course necessary to have the glass quite *visibly* clean and, at the same time, chemically so to a reasonable extent, but there is not the same necessity, as in the wet collodion process, for absolute chemical purity. The fact is, that in the absence of free or soluble silver salts, there is far less danger of stains arising from imperfectly cleaned plates, and when alkaline development alone is concerned a plate that has been rendered apparently clean to the eye will generally pass muster. Ferrous oxalate is more searching in its action, and requires greater care, but silver intensification calls for the same degree of purity as the wet plate. Bearing these facts in mind the operator will be able to judge, from his method of working, how far he can afford to 'shirk' the cleaning of his plates.

Some collodion emulsion workers use and recommend a substratum for the double purpose of producing a clean surface and causing the collodion film to adhere to the glass. This practice I consider not only troublesome, but quite unnecessary, and in some cases actually injurious. The indiarubber solution usually employed is the simplest and easiest in use, but the film it leaves is partially soluble in ether and alcohol, and is consequently liable to cause markings and insensitiveness of the film. I have known emulsions of so porous a character that, on applying them over an indiarubber substratum, the latter has been softened and absorbed into the emulsion film to such an extent as to render it almost impervious to development. In less aggravated cases the partial absorption may be sufficient to cause serious irregularity, and even when only an edging of indiarubber is employed it very often leaves the plate with an unsightly margin corresponding with the substratum.

Nothing in my experience is equal to the simple polishing with French chalk properly performed. This supplies not only the necessary purity of

surface, but causes the collodion to adhere with a tenacity quite equal to the best substratum, while at the same time, paradoxical though it may seem, it greatly assists the film in stripping when necessary.

Polishing with talc has been described as a 'dirty' method, but the dirtiness exists only in the operator's method, or want of method, of working. All that is required is a wide-mouthed bottle, containing perfectly dry powdered talc and having a piece of fine muslin tied over the mouth, a clean silk or chamois leather polishing cloth, and a dusting brush. The glass having been washed and dried, a small quantity of talc is 'dredged' on to the surface from the muslin-covered bottle, and gently, but thoroughly, rubbed into the glass. Here is where most beginners fail. Having chalked the plate they proceed to apply the polishing cloth with the force of a burnisher, and the vigour of a winnowing machine, with the result that every trace of talc is removed from the glass and set floating in the atmosphere of the room. What is wanted is not force and vigour, but a gentle spreading of the talc over the glass, so as to leave an impalpable film behind; then the surperfluous powder is dusted off, and the glass is ready for use, with a clean, adhesive surface.

In the case of opal, especially when 'smoothed,' it is absolutely necessary to apply a substratum, as the opal surface not only has no adhesion for the collodion, but seems actually to repel it. In such cases a five-grain solution of gelatine applied warm is far superior to indiarubber.

Coating the Plate.

The first attempt to coat a plate with collodion generally results in a dismal failure to cover the glass, the liquid running in apparently every direction but that desired. When, however, the art of mere covering is acquired, all difficulty ends, and it is only by the grossest carelessness or with thoroughly unsuitable collodion, that an uneven film is obtained. In the case of emulsion, however, the operation of coating is a little more difficult owing to the suspended matter it contains, and its consequently lower degree of fluency. Though no more difficult than collodion to spread over a surface of glass, it is far more so to secure an even emulsion film free from ridges, 'crapy' markings, and mottling; with a good emulsion and a little care in the mode of applying it, the task is, however, easy.

The proper way to proceed is to pour on to the glass as much emulsion as it will conveniently carry, then to cause it to flow into each corner in succession, so that the whole surface of the plate is evenly flooded with a considerable depth of the liquid. Now pour off the surplus steadily and with moderate rapidity, rocking the plate gently the while, and keeping up the motion until the emulsion ceases to drip. In this manner the whole surface of the plate commences to set almost simultaneously, with the result of even drying; whereas if only a small quantity of the emulsion be poured on to the glass and flowed from corner to corner, the first portion of the glass covered will have set before the surplus has been poured off, and even if free from ridges, the film will be marked by serious want of uniformity.

Before applying heat to dry the film, or before wetting it when a preservative is to be applied, allow it to set very thoroughly; or rather, do something more than let it set, give time for the greater part of the

solvents to evaporate. Short of allowing the edges to become actually dry the time thus allowed cannot be too long.

Drying the Plate.

If the directions just given be followed, there will not be the slightest difficulty in drying with absolute uniformity either spontaneously or by artificial heat. If the drying be conducted slowly at the normal temperature, it is safer to guard against air currents which under such circumstances are liable to cause drying marks; but when heat is used this danger is almost altogether absent. My own mode of drying consists in using the flat metal top of my dark-room lantern, across which I lay strips of wood about an eighth of an inch thick. On these the plate is placed when thoroughly 'set' as described, and is dry in a minute or two.

Using the Emulsion Wet.

Some misunderstanding is abroad regarding the utility of employing the emulsion wet. Under these conditions it is supposed to be more sensitive, but this—at least, in the case of a properly washed emulsion—is not so. If a plate after coating be allowed to become partially dry and is then exposed and developed, it will be found that the sensitiveness is not at all affected by the drying. If the film be simply wetted before development, the dried portion of the image will be much thinner than the other owing to the pores of the collodion having been closed up by drying; but if dilute alcohol be applied over the whole surface and then washed away again, the permeability will be *almost* perfectly restored, and only the slightest difference will be traceable between the two portions.

There is a decided advantage in mere saving of time in using the emulsion wet—*i.e.*, undried—when working at home, since not only is the time and trouble of drying saved, but the development is quicker and more even. In this case it is only necessary to coat the plate and expose it *without washing*, only taking care that no portion of the film is allowed to dry before development. The washing to remove the last traces of ether and alcohol takes place, then, immediately before development. In the instance of an unwashed emulsion, containing soluble matter, the washing must of necessity precede exposure.

When an increase of sensitiveness is desirable, then it is necessary to wash the film and employ an organifier or accelerator. This consists of any comparatively inert organic substance, such as gelatine, with the addition of a small proportion of alkali, which is the active ingredient, the gelatinous, gummy, or otherwise viscous organic matter being useful only in preventing the too rapid drying of the film. Plates preserved with gelatine, gum, or similar substance, with the addition of a trace of glycerine and carbonate of soda, may be placed in the dark slides and kept for hours or days before development.

It is advisable, however, before placing in the slides to allow the films to become perfectly surface-dry; in fact, after they have been kept some little time they appear to be *perfectly* dry, yet if the preservative be properly compounded the permeability of the film remains quite intact. For employment indoors, that is when development is to follow directly on exposure, a plain alkaline solution may be used as accelerator. Except for the purpose of modifying the colour or density of the image, such substances as tannin, gallic acid, coffee, *et genus omne*, should be

avoided. This does not apply to unwashed emulsions, which are frequently greatly benefited in sensitiveness as well as quality by an application of tannin or gallic acid, but a washed emulsion is, or should be, complete in itself and independent of any outside assistance.

Exposing by Contact.

Though not a matter connected with the preparation of the plate, I should like to say a word on the exposure of collodion films by contact in the printing frame. Many complaints reach me that the films are damaged by the pressure against the negative, and this is certainly very likely to be the case under ordinary circumstances. The glass employed for dry plate purposes nowadays is frequently of so questionable a character as regards surface that it is not surprising if the pressure of an ordinary printing frame causes abrasion of the tender collodion surface. One remedy is to employ one of the specially constructed lantern slide or transparency printing frames, in which provision is made for the prevention of such injury. Another plan, which is simpler, and quite as efficient, consists in interposing one of the lantern slide 'masks' between the negative and plate; this prevents contact without, incredible as it may appear, in the slightest degree detracting from the sharpness of the image. It also has the additional advantage of giving the slide a neater and more finished appearance.

THE USE OF A LENS COATED WITH TURMERIC.

By Capt. Abney, C.B., F.R.S.

The season in the Alps I devoted a good deal of time to exposing plates to snow mountain views through a lens coated on two surfaces with turmeric in collodion, taking the same views with a lens not so coated, and then comparing the resulting negatives. The mode of preparation of the turmeric collodion was as follows:—Turmeric powder was placed in alcohol and a saturated solution obtained by boiling. After settlement the alcohol was decanted off and to each ounce of clear fluid ten grains of structureless pyroxyline was added. The same quantity of ether was next poured into the alcohol and solution of the pyroxyline thus secured after filtration. The two surfaces of a single landscape lens were coated with the collodion. When dry the lens was remounted in its cell and was ready for use. On the focussing screen this lens made the picture appear of a greenish hue throughout, and I expected a marked difference in the skies obtained when using it and the uncoated lens. As a matter of fact, I could not trace the slighest indication of the coated lens having been used in the negatives obtained with it. The uncoated lens and coated lens acted exactly the same, much to my disappointment. I also expected that the thin haze of a distant landscape would be modified; but neither this I find to be the case. It mattered not whether ordinary plates or isochromatic plates were used, I still found the same thing. It should be noted, however, that the light when the views were taken was not a sunset light, otherwise a difference, perhaps, might have been observed. A lens coated with aurine in collodion, however, behaved better, and the results were modified in the manner I expected. The exposure necessary with a lens so coated has to be considerably prolonged to get any result

when an ordinary plate is used, and, indeed, when an isochromatic plate is substituted the exposure is by no means approaching that of an ordinary plate with the uncoated lens.

CARD MOUNTS—GOOD AND BAD.

By John Spiller, F.C.S.

In the days when photographs were invariably mounted either upon what was called 'Bristol board,' or upon the thinner sort of plate paper, the only question that was likely to arise turned upon the presence or absence in the finished article of such substances as were legitimately employed in the paper manufacture. These were, on the one hand, the bleaching chlorides left in excess after discharging the colour of the pulp, or the adventitious presence of a certain amount of hyposulphite, used as 'antichlor,' to absorb the free chlorine and shorten the process of washing. Then it sufficed to test for one or other of these chemical impurities, and to determine whether either of them was present in such amount as to be prejudicial to the permanence of any photograph which should be mounted upon the aforesaid paper or card. With the requirements of later times, and the demand for thicker panels and cards, coincident with the introduction of wood pulp into the paper manufacture, and, moreover, the fashion of using mounts coated with deeply-coloured pigments—brown, black, chocolate, or olive—fresh difficulties have arisen in consequence of the want of judgment displayed in the selection of the pigments employed for such purposes. Furthermore, we have had the bronze powder practices to contend against, certain to cause spotting and fading so long as the silver printing processes remain in vogue. And, lastly, we have the new enamelled cards, which, so far as my experience indicates, are a step in the right direction.

Having lately examined a considerable number of card mounts, both of British and foreign manufacture, I am desirous of placing on record a simple means of testing, well within the photographer's own powers of observation, whereby he may ascertain at once whether any card mount submitted to him is suitable for his own use. Let him first ascertain whether the colour is fixed in the case of a dark mount by immersing it in warm water, putting a slip of the card into a test-tube and holding it up to the light to see whether any soluble colour 'bleeds out.' Should this happen, he knows at once that it will be quite impossible to dismount a photograph at any time without staining the high lights and degrading the general tone of his picture. Many of the chocolate mounts now on sale will not pass this test, but I am bound to say that others will do so, and he will have the choice in his own hands.

Being satisfied as to the permanence (or insolubility) of the pigment, the next point to be inquired into will be to ascertain the presence or absence of chemicals left in the pulp which may cause fading. For this test let a lightly-printed and well-washed photograph be cut in pieces and mounted upon the trial card against others of which the quality he has by previous experience approved. Then wrap them all up together between successive folds of wet blotting paper, and put the parcel away for a day or two in a tin box. When opened, should any signs of fading be apparent, the operator will draw his own conclusions.

To judge of the quality of the gilt edges or embellishments touch these surfaces with a dilute solution of silver nitrate, when a low standard of gold leaf or a spurious gold (bronze) will turn grey or brown, showing that some of the metal is attacked and a proportionate deposit of reduced silver formed. Remember that ornamental designs and printed descriptions (name and address) are seldom done in pure gold, so that it is most unwise to expect them to be so executed. Gilt edges are as a rule reliable, but it is well now and then to put them to the test in the manner indicated. Do not encourage the bronze trade, for the Dutch metal has to be rubbed far and wide over the surface of the card, and wherever these particles go they are sure to bring mischief in their trail by spotting or fading the mounted photograph.

WEIGHTS AND MEASURES.

By Baynham Jones.

I think it will be very generally acknowledged that there are very few things which require amendment more than our weights and measures, and I believe that this may be carried out without much difficulty or introducing much new matter.

At present the great difficulty of comprehending them is so great, even to those who 'are to the manner born,' that foreigners may be excused for making use of much unparliamentary language when obliged to employ them. At the present time I find, on referring to Butler's Tables, that there are at least twelve, all tending to make 'confusion worse confounded.' My own opinion is that these difficulties may be in a great measure overcome by amalgamating such portions of the existing tables as may be best suited to the purpose, and then abolishing the whole of the remainder. I would make it imperative that anything either solid or liquid should be sold by weight, and every measure, with the exceptions of long measure and land measure, which, however, require considerable alteration, should be abolished. As matters now stand fruit, vegetables, seeds, and a variety of other produce are measured in baskets, which are supposed to contain quarters, half pecks, pecks, and bushels, but which are generally far beneath the mark, and even supposing them to be full measure, let half-a-dozen men measure from the same basket, and I would venture to say there would be a difference of at least ten pounds between them. Chemists buy their drugs by avoirdupois and compound them by apothecaries weight.

Many other things are sold by numbers; that is to say, scores, hundreds, and other denominations which do not correspond with the numbers specified, as, for instance, 100 of walnuts is by custom 120; 100 of asparagus is, I believe, 150. Then come a series of weights and measures which would puzzle a conjurer. I could spend an hour in pointing out all the discrepancies, but I think I have said enough to make out my case, and I hope that I may succeed in stimulating others to take measures for putting matters in a better form.

I have carefully examined the tables now in use, and I have come to the conclusion that the avoirdupois weight should be selected as a basis

of any new system, and I think it will require but slight alteration, and would suggest the following version, namely :—

60 grains	1 drachm.
8 drachms	1 ounce.
16 ounces	1 pound.
100 pounds	1 hundredweight.
20 hundredweights	1 ton.

This would, I think, be sufficient for all purposes, excepting superficial and long measures, which would require, as I have before said, separate tables to themselves, but would require considerable alteration, and comprise inches, feet, yards, and acres only.

The French metrical system has, I think, many advocates, but my impression is that it is infinitely inferior to our own even in its present unsatisfactory state.

SO NATURAL!

By H. P. Robinson.

'How very lucky you were to get these nice subjects! Were they instantaneous?—they look so natural.' This is one of the awkward compliments that are often paid to the photographer for which he does not feel grateful. It is difficult to persuade the general public that a successful picture produced by photographic means is not due to luck. They will give him credit for technicalities; they will allow that he uses the machine with skill; they will admit that he knows how to focus, for is not the picture sharp all over? to develop, for there are no stains visible; to print, for there are no signs of measles. But when they see, that which is really the result of the highest skill, good composition, well managed light and shade, 'go,' and spontaneity, they say, 'So natural! how lucky!' Then again, but quite on the other hand and unintentionally, they will give you credit for high artistic skill by asking, when you show them a *genre* photograph, 'Whose painting did you copy it from?'

It would be useless to deny that even the most skilful photographer is often indebted to luck for a good deal of his aids to success. For instance, the sun may shine when he wants the direct aid of its light, which simply means that he can do his work at once instead of waiting until another day; or his model may stand in a graceful attitude, and suggest a good subject to him; or he might meet with a picturesque waggon and horses, or an unexpected group of cattle which seems to insist on making a picture without much assistance; but all these advantages would be of little use if his artistic treatment was at fault. Beautiful and unexpected things are always happening in nature, but are wasted if the photographer does not know how to turn them to his profit.

'How easy and natural those portraits are! I am sure you did not use that dreadful head-rest,' another will say, looking at some portraits behind the sitters for which you probably built a regular scaffolding of rests, not for the purpose of keeping them still, but to prevent them sinking into an awkward position. And so they go on, confounding nature with art.

Yet nature, having no inner consciousness, knows nothing about art. Nature takes life as it comes, in a very apathetic and happy-go-lucky sort

of way, while true art takes the best of nature and improves upon it, or, if it cannot get the best, it does its best with what it can get, and, as Theseus says in *A Midsummer Night's Dream*, 'The worst are no worse if imagination amend them;' or, in other words, that art can redeem most subjects.

Let us see, apart from art, what the scientific representation of nature is like. Let us inquire if scientific fact is like the nature that meets our view.

The detective camera takes nature as it is, yet it fixes for us what we never see. Would anybody ever exclaim, 'So natural!' on looking at Muybridge's horses, or even at many ordinary instantaneous photographs of the human figure? A photographer can fix on his plate the spokes of a bicycle wheel as it revolves at a rapid pace, but who ever saw the spokes when the machine was going at the rate of ten miles an hour? It was considered a great feat to photograph an express train going at its fastest, the result was a representation of a train apparently standing still, with an unmeaning cloud of steam and smoke trailing behind it. The waves of the sea are sometimes photographed so quickly that they lose spirit and motion, and appear frozen. If Perdita was expected to dance 'like a wave' of some of these seas there would be another statue in the *Winter's Tale* as well as Hermione. Yet this is nature as represented by science. The artist knows better and gives, or endeavours to give, you truth as you see it. There is a great deal of nonsense in this parrot-cry for nature and fact. It sounds well, but the meaning of it is not generally understood. No artist would deny that art is and must be based on nature, and also that nature must be constantly studied; but art is treatment of nature, not nature itself, as some painters and a good many photographers seem to think. Wax flowers and fruit look very like nature, and sometimes a good deal better—more bloomy and brilliant—but who would compare the finest and juiciest waxworks with the splendid representations of fruit and flowers painted by George Lance and old William Hunt, or, indeed, of many of the advanced pupils of our art schools.

To make this matter of seeing nature, or representing it 'So natural!' more clear, let me take an illustration from our most familiar instrument, the camera. Take a figure a few yards away from the camera, and get it in focus; let there be another object, say a white cow, fifty yards away and nearly behind the figure, expose a plate, and what will be the result? The figure will be in sharp focus and the cow would be a smudge, without form and void. This is a scientific fact, and would be exactly what the eye also sees if the focus of the eye, like that of the lens during the exposure of a plate, remained stationary. But natural truth demands that the representation should show that which the eye practically sees, which is a very different thing. Now the focus of the eye changes so instantaneously that it practically, although not actually, sees both objects in focus at the same time, yet not both equally sharp, for distance tends to obliterate detail. This absolute impossibility of representing with the lens alone what the eye sees is made easily possible by combination printing.

There is just one more nail I should like to drive into the coffin of photographic fact, which, when buried, I hope will leave more space in the photographic world for natural truth.

Given as a subject a heath scene, with the sun setting surrounded by clouds, 'a golden evening stretching forward to the setting sun.' If a photograph is made of this subject, and sufficient exposure given to bring out all the visible details of the landscape, the result will be a picture of

a heath with a plain sky, the excessive exposure will have obliterated the sun and clouds together. This is 'the supreme power of facts.' Is it truth?

The remedy. Take the same subject, photograph the sky on one plate with a short exposure, and the landscape on another with a long one; print them together skilfully, and you get something that is, at all events, much nearer nature than a representation that ignores the sky altogether. Yet I have heard a photographer say: 'What art of combination printing can equal in satisfaction the straightforward, honest rendering of a phase of nature?' and there are still those left among us who insist on scientific fact, the rigid fact and nothing but fact, in photography, and persuade themselves it is 'So natural!'

THE VALUE OF HYDROQUINONE FOR GELATINE PLATES.

By G. Watmough Webster, F.C.S.

The practical experimental work which of late has most occupied me, having been an endeavour to ascertain for professional photography the actual working value, in dry-plate development, of the above-named chemical, some account of the results obtained may not be unsuitable for the pages of the Almanac. Many years' experience in photography of all kinds leads to the belief that the new methods of work, the new chemicals, the new processes, that on their first introduction are extravagantly lauded, prove, as a rule, to be of little value when put to the test. The good reports as to hydroquinone, however, have been so persistent, and have come from so many widely different quarters, that it seemed as if, in this instance, there must be some nucleus of good in the new developer, however great or small it might be. The varied character of the reports may be explained by the fact, which appears to be undoubted, that different makes of the substance in question greatly vary in quality and in action upon the plates. It is, therefore, proper to state that the sample employed in obtaining the results to be described was labelled 'Byk's.'

In the rough preliminary experiments it was soon found that hydroquinone possessed, at any rate, a power of producing great density, and this it obtained with solutions considerably less in strength than those of pyro as generally employed. The formulæ already published for 'hydro' developer have been most remarkably discrepant, varying in strength from half a grain to six or more per ounce of water, and the alkalies in proportion of from two to nearly twenty grains per grain of hydroquinone; and similarly wide have been the recommendations as to the alkali, or mixture of alkalies, to be used with it.

These pages are not for detailed records of experiments; results and recommendations are, no doubt, what are of most value; hence space shall not be occupied by describing preliminary trials. It may here be noted, however, that for sensitometer trials (and they are essential for the obtaining of quick and true results in such experiments as these) a gas flame will be found more useful than the luminous tablets. Single-handed, or working with assistance, four or five times as many exposures may be thus made and relied upon, if made at one time. The first trials were without bromide, and they showed that this salt was by no means necessary, as the negatives were quite free from fog. Further, it was seen that beyond a proportion of two grains of alkaline carbonate to each

one of hydroquinone, large increments of alkali did not have any considerable effect on the apparent exposure.

A large number of plates exposed all proved that 'pyro' and ammonia indicated far greater sensitiveness than 'hydro' and fixed alkali, and that, in fact, so far as results were concerned, the new developer was distinctly inferior to the old. The next trials were with the addition of bromide of potassium, and they showed that this salt had an effect upon exposure very far beyond what it had in the 'pyro' developer. In the latter the common proportion used is from a fourth to a half of the ammonia employed, in which quantity it has what may be termed a benignant, restraining influence. But with the 'hydro' developer, bromide in the proportion of one-twelfth part of the alkali used was sufficient to reduce the sensitometer indications from number twenty to three or four.

The next important quality this developing agent was credited with possessing, was its non-staining action upon the film. It is always desirable when testing new formulæ to reduce them to their simplest form, that results may be traced to their true cause and without confusion. In the experiments referred to, sulphite of soda was, therefore, left out. So far from hydroquinone giving unstained negatives, it gives exceedingly yellow, or brownish-yellow, films, far deeper than 'pyro' without sulphite. It is, however, to be observed in this connexion that the addition of sulphite is authoritatively stated to greatly influence the non-staining effect.

The question thus arises: 'Is hydroquinone of any use at all for developing gelatino-bromide plates?' The practical answer is that it has considerable value in saving an otherwise hopelessly exposed plate. A good gelatine plate, with a fair proportion of iodide in its composition, will allow a good negative to be produced with a considerable excess of exposure, if plenty of bromide be used at an early enough stage; but there is a practical limit to its usefulness when many plates have to be developed in a reasonable time. Hydroquinone, however, puts a new power into our hands in this direction. A plate exposed beyond redemption, so far as regards ordinary means of development, may be not only saved, but made into a first-class printing negative, by taking it out of the ordinary 'pyro' developer, and, without any washing, at once immersing it in one of hydroquinone, with or without bromide, according to the extent of the excess of exposure. So far as the experiments above referred to may be taken as an indication, the true value of hydroquinone as a developer for plates lies in its power of saving an over-exposed plate, allowing density to be attained in such cases in a fraction of the time that pyro with excess of bromide would require, and permitting good negatives to be produced when pyro would entirely fail through extreme excess of exposure.

CELESTIAL PHOTOGRAPHY IN 1888.

By Rev. S. J. Perry, D.Sc., F.R.S.

This year is principally remarkable for the activity with which the preparations are being pressed forward for the great work of photographing the starry heavens, and for the steady application of previous methods of research. At the beginning of the year England could scarcely be numbered among the nations who were taking an active part in this vast international work, but now, in addition to the observatories of Melbourne and Sydney, furnished by the Colonial Governments with the requisite

instruments, the British Government has sanctioned the purchase of photographic telescopes for Greenwich and the Cape, and the generosity of Dr. Delarue has supplied the funds to enable the observatory of the University of Oxford to share in the honour of this grand undertaking. The observatories that are now working in concert, and are being supplied with the same form of instrument, are fairly divided between the two hemispheres. France is represented by Paris, Bordeaux, Toulouse, and Algiers; Great Britain and her Colonies by Greenwich, Oxford, the Cape of Good Hope, Melbourne, and Sydney; Germany by Potsdam; Spain by San Fernando; and Mexico, Brazil, Chili, and the Argentine Republic by the observatories of Tacubaya, Rio de Janeiro, Santiago, and La Plata.*

Many questions of great importance from an optical, photographic, or economical point of view, have been satisfactorily investigated in the course of the present year. Thus, for instance, the best form of lenses has occupied the attention of Prof. Stokes, Sir Howard Grubb, and the Astronomer Royal; curved plates have been experimented upon at Greenwich by Mr. Criswick; the distortion of films has been shown by Dr. Vogel to be capable of accurate correction; the degree of accuracy attainable in the measurement of star photographs has been determined by the brothers Henry; Sir H. Grubb has perfected the driving clock of the telescope; Dr. Gill has drawn up a scheme for the measurements of the negatives and the publication of the results; and Mr. Roberts has designed an instrument by which the photographic plates can be engraved with the greatest accuracy, and copies thus be multiplied whose measurements will be as reliable as any obtained from the original negatives.

At the Astro-photographic Congress held at Paris last year a second committee was formed, consisting of Dr. Janssen and Mr. Common, with power to add to their number, for the purpose of devising the best means of promoting the rapid advance of photographic astronomy by combined action. A circular of invitation has been issued to those most likely to take part in this most attractive branch of observational astronomy, and the probable issue will be a vast saving of time and labour by the avoidance of useless repetition. The grand work in this direction already achieved by Dr. Janssen at Mendon, by Prof. Pickering at Harvard, by Dr. Vogel at Potsdam, by the Henrys at Paris, by Mr. Common at Ealing, and by Mr. Roberts at Maghull, are an earnest of what could now be done by happily combined action. This year, too, has added largely to our hopes of a brilliant future by witnessing the completion of the gigantic thirty-six-inch refractor of the Mount Hamilton Observatory, and of the splendid five-feet reflector of Mr. Common.

But the year 1888 has not been spent in preparations only for future work, for labours previously commenced have been carried on with increased vigour. In America Prof. Pickering has been indefatigable with his photo-spectroscopes, and he has already secured the spectra of 27,953 stars spread over the heavens from the North Pole to a distance 25° below the equator, besides preparing enlarged spectra of the more brilliant stars. The brothers Henry, with their thirteen-inch refractor, have obtained many fine pictures of clusters and nebulæ, and their magnificent engraving from the photographs of the Pleiades surpasses anything as yet published in delicacy and amount of detail. And in the same rich field of discovery we have to record fresh triumphs of Mr. Roberts, whom cloudy skies are forcing to seek a new home for his twenty-inch

* To this list we may now add the observatory of Helsingfors.

Cassegrain. At Potsdam Dr. Vogel has obtained this year some most satisfactory photographic determinations of the motion of stars in the line of sight; and Prof. Pritchard has added a number of new stars to the list of those whose distance from the earth he had previously calculated from measures of his photographs. Solar photography is now, perhaps, too much a matter of daily routine to require more than a passing mention; but the excellent pictures just published by W. H. Pickering of the eclipse of 1886, and the prints forwarded from Japan of the eclipse of 1887, must not be allowed to pass unnoticed.

This rapid review of the results of the present year, however imperfect, suffices at least to show that astronomers are fully conscious of the aid their science is sure to receive from photography judiciously applied; and with their new instruments, and the experience already gained, we may feel confident that the coming year will witness successes greater even than those which have been recorded in the past.

PHOTOGRAPHING A BURNING BUILDING.

By Professor Coleman Sellers, E.D.

It is not very often that one has a chance to spend a night taking pictures of burning buildings. When the chance comes it is well to know what to do. Summering in a charming New England village, the cry of fire one night in August roused us from sleep to find the room flooded with light, bells ringing, and cries of alarm. Reaching the front of the house, the street, three hundred feet wide, was seen to be full of horses turned loose from a large stable, while only a few hundred feet away a large wooden building, called Beach's Block, in which were shops in the lower part and lodgings above, was in flames. From that moment during the next four hours one building after another, all of wood, took fire, including a large Court House not quite finished, which had been destroyed in a fire of two years ago. There being no means at hand to extinguish the fire, attention was given to saving the buildings near by and securing such goods as could be removed before the fire took hold. The village photographer had his camera on the ground, and I had the chance to expose two dozen plates with a detective camera. No plates were developed until the fire was over, and then the mistakes were evident.

In photographing a fire the nearer the camera is to the light the better will the picture be. All pictures taken that night were failures to the extent of the illuminated part of the plate being too small. The whole place seemed so very light that all who exposed plates stood their instruments too far off, and the picture taken was very small. With a detective camera one could have gone close enough to the building to make the one burning building fill the whole plate. The intensity of the light being as the square of the distance, the near approach to the building would, while covering the plate, have given many times more light effect on the plate. Snap pictures of fires give nothing but the picture of the flame and the objects very close to the flame.

My pictures were taken from a distance of, say, two hundred feet from the buildings, while I should have taken the camera to within fifty feet of the fire. This is readily done when no tripod is used, and one can shelter himself behind a tree-trunk or other object and expose the plates at his leisure, watching for the moments of falling walls and the fierce rising of the flame.

SMALL STEREOSCOPIC NEGATIVES.

By R. L. Maddox, M.D., Hon. F.R.M.S., &c.

Last year I had the pleasure of contributing to The British Journal Photographic Almanac an article entitled, 'Small *versus* Large Negatives for Photo-micrographs.' This year I propose to explain the method adopted, with almost the same arrangement as there figured, page 290, for obtaining small stereoscopic negatives; and this the more readily, as I have heard that our esteemed Editor has a slight weakness for the revival of stereoscopic pictures, and that the following may, perhaps, help to fortify this trifling infirmity. Instead of using the small brass camera box at the eye end of the microscope, as figured at page 290, The British Journal Photographic Almamac, 1888, a thin frame is used to take its place. This frame, or slide carrier, is made about 7 inches long by $3\frac{1}{2}$ inches wide, and $\frac{4}{10}$ths of an inch deep, outside measurement. Mine I made from a ground-glass drawing-slate. The frame is floored with a thin piece of mahogany. At $3\frac{4}{10}$ inches from the left inner edge of the frame this floor is pierced with a circular hole, into which is fixed a tube one inch long; the aperture in this tube fits with slight friction on the eye end of the additional eyepiece tube used to register the image, as seen by correct focussing with the eyepiece, and with the fine lines scratched on the under side of the plain glass plate focussing screen. Corresponding to this aperture in the floor, a thin slot is cut in through the upper or top side of the frame, and through it works a thin piece of pear-wood veneer, two inches wide, with a bevel round three sides, the outer side being left of a sufficient length to be able to draw the shutter easily, by projecting about half an inch, or rather less. Three pieces of thin ebonite, with a bevel on the inner edge to correspond with that on the shutter, are glued to the floor of the frame close to the shutter when in position, as in these bevels the shutter works light-tight on three sides, the draw side being made light-tight, when closed, by a narrow slip of wood glued across the outer side of the little shutter.

The floor is now lined by two pieces of hard velvet, so as to be exactly flush with the upper surface of the ebonite strips, the thin shutter being entirely lined on the inside with fine black cloth, made also flush with the ebonite slips. In this frame slides the plateholder, which is made of a thin, rectangular, flat box, the inner dimensions corresponding to the half of a $4\frac{1}{4} \times 3\frac{1}{4}$ plate, so that it may drop in easily. The floor of this plateholder has two circular holes cut in it, their centres being about $1\frac{3}{4}$ inch apart, and of a diameter corresponding to the aperture of the short tube in the frame. The cover or lid of this thin box is hinged by velvet, and provided inside with a bent brass spring, which, when closed, shuts down on a loose piece of ebonite, lined on its inner side with black cloth, this also fits easily into the box, and when in use drops on to the back of the sensitised plate. On the outer near side of the box is a button-hook which holds the cover down light-tight, and on the same side is fastened a small brass guide which clips the outer edge of the frame. Marks are made on the frame to register the left-hand top corner of the flat box when its left aperture corresponds with the aperture in the floor of the frame, the shutter being withdrawn, and another mark is made to register the right-hand corner when the right-hand aperture rests exactly over the aperture in the frame. This slide-

holder must pass along the inside of the frame, resting on its floor without the least deviation in its level. To use the above, the additional eyepiece tube is pushed into the short tube in the frame, and then pushed into the outer end of the draw tube to the microscope; the flat plateholder box is now placed in the frame and slid along until it registers its aperture as marked on the frame. A flat piece of thin plate glass the size of half a quarter-plate has one of its surfaces ruled diagonally with very fine diamond-scratched lines, about one-sixth of an inch apart; this plate being placed in the box, ruled surface downwards, a rather coarsely-marked object, as a coarse diatom or butterfly scale, is placed on the stage of the microscope, and illuminated as in ordinary use by sub-stage condenser and mirror, the focus being made to correctly register the image on the scratched lines when examined by a small, well-made, focussing glass. This is held in the left hand, the cover of the box being held up for the occasion by one finger, but without making any pressure on the glass plate, yet closely applied to it. While adjusting the focus it is best to cover the head and frame by a focussing cloth. Having focussed the image for one aperture, the box is now slid along the frame and the image observed through the second aperture; the two images should exactly correspond. Having obtained a correct correspondence between the image and lines, as tested repeatedly, gently remove the frame from the additional tube *without disturbing the focus*. Now insert the ocular in the additional tube, and gently withdraw this tube until the exact focus is found, then mark the tube with a pencil; repeat this several times. Now withdraw the ocular, insert the frame and slide-holder, and by the focussing glass see whether the image *now* corresponds exactly with the lines; if correct, make a mark on the additional tube at the fine pencil mark, and get a thin piece of tube to slide over the additional tube, and when abutting against the shoulder of this tube, let it be cut to the exact width between the shoulder and the mark on the tube. This additional E. P. tube should be dead-blacked on the inside, but as this is soon worn off at its upper part by the insertion of the eyepiece, it is as well to make a little dead-black paper tube to fit into it for the same distance as the ocular enters, and to let it remain in the tube when employed photographically. Having carefully tested the correspondence of the image with the ruled lines, place the object to be photographed on the stage, insert the ocular with the additional tube and focus as usual. Having selected the proper focus and the right illumination, the sub-stage condenser having been previously truly centred, turn down the mirror and bring the lamp into position with the narrow edge of the flame opposite the stage of the microscope, and by the sub-stage condenser bring the flame into focus along with the object, now withdraw it slightly and again proceed to focus with the ocular, then carefully withdraw the eyepiece, put the little tube of dead-black paper into the additional tube, or if any fear of deranged focus by the heat from the lamp leave the ocular in position, and take the frame and box into the dark room with a light black velvet focussing cloth; insert the sensitised plate, having removed the plain ruled glass, cover it with the ebonite plate, close and fasten the lid, place the holder in the frame so as to register the left corner exactly, cover with the velvet, and now re-examine the object to see if the heat has displaced the image; if so, make the necessary alteration, remove the ocular, insert the tube of

black paper, and place the frame in position *gently*, cover up the flame, withdraw the shutter, and give the necessary exposure, to be found by practice; then close down the shutter, shut out the light, slide the holder to register the right-hand corner, and repeat the exposure. The shutter need not be entirely withdrawn, but only sufficiently to clear the aperture. The operation finished, withdraw the frame and paper tube, re-insert the ocular, and note if the focus remain perfect, and proceed to develop by any of the usual formulæ; the two images should correspond.

Now, to make these stereoscopic several plans may be adopted; such as using for low powers a cap with a semi-diametric opening which fits on the nose of the objective, and is placed, firstly, to stand vertically on the right side for one picture, and then rotated to stand vertically on the left side for the second picture, or the sub-stage condenser can have half its upper or lower lens obscured by a semi-circular stop, or one of any shape that allows half, or more, or less, of the dioptric beam to pass; or an equilateral prism can be used without the sub-stage condenser, and rotated to opposite sides, the light being shifted to equal, but opposite, illumination, or in several other ways well known to the microscopist. The frame should be kept parallel with the front of the stage of the microscope.

These small negatives can now be enlarged to the stereoscopic size by ordinary methods, and on any medium collodion, gelatine, albumen, &c. They can be reversed as to right and left, and be dealt with in different ways. If they do not differ enough by the force of contrary shadows, the focus can be altered very slightly in one negative, so as to assist by obtaining depth of image.

The foregoing is only one way of making the frame and holder, and possibly not the best; but the object was to secure lightness and movement of parts without disturbing the focus, and the examples prove this can be done correctly, using due care.

Without reference to stereoscopic images, it enables one to make exposures of different duration on the same plate, or to obtain two different size negatives of the same objects, though both small, or one entire and the other part of the object, as seen, considerably enlarged, by the use of the high power immersion objectives.

NOTE ON 'NEGATIVES IN NATURAL COLOURS.'

By W. Jerome Harrison, F.G.S.

The object of this note is to ask readers of the Almanac to study carefully their negatives by reflected daylight with the object of ascertaining if any show traces of colour. Should any tints be detected which seem pretty obviously to belong to the objects depicted, and not to be mere examples of green or red fog, I would suggest that the negatives be sent to the Editor—who has, I know, long been interested in the subject—who would doubtless give some account of them in The British Journal of Photography.

My own remarks are now called forth by the fact that, in looking through my negatives, I have lately noticed one which shows decided traces of what appear to me to be natural colours. It is a negative—on Eastman paper—of Beaumaris Church, Anglesey, a fine old building sur-

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rounded with low bushes and trees, and partly covered with ivy. The negative was taken on an August afternoon (about four o'clock). It is whole-plate size, and the paper was used on a roll-holder. A rather long exposure was given, and when the negative was developed, a week or two later, it came up easily, without any forcing, by the aid of the pyro-ammonia developer employed. As I developed a large number of negatives at the same time, I did not examine them particularly until a few weeks later, when on taking up the Beaumaris negative and holding it before me at an angle of forty-five degrees—standing with my back to the light—I saw instantly that the natural tints of the objects had been perfectly reproduced. The church itself is of a warm purplish grey, and the bushes, ivy, grass, &c., are depicted in various shades of green. These tints do not overlap or interfere with one another in the slightest, and they do not extend over the other parts of the picture, such as the sky, footpaths, tombstones, &c. Although the tints are dull, yet they are quite as bright as the colours of the actual scene were at the time the negative was taken, for it was a rather dark, stormy day.

I should add that by *transmitted* light no trace of colour can be seen on the negative. I am unable to offer any reason why colour should be seen more in this particular negative than on others taken on the same day (which show no trace of it). It has long been known that negatives in colours could be taken; but it has usually been stated that they could not be *fixed.* In this case, however, the colours seem to have withstood the fixing process.

By the collection of individual facts we may, perhaps, arrive at something definite. And hence my appeal to my fellow-photographers to examine their negatives for traces of natural colours. Do not expect to see anything vivid or startling—by gaslight it will probably be impossible to detect anything—but if any tints are found follow my example and send the negative up to the Editor, for I know he has studied this subject for quite a quarter of a century, and if we can only give him sufficient facts it may be that he will be able to build a theory upon them.

THE POWDER OR 'DUSTING ON' PROCESS IN PRACTICE.

By W. K. Burton (Tokio, Japan).

A series of articles on the 'Dusting on' process, which appeared in The British Journal of Photography some months ago, came to me in good season, as they came just when I was about to set seriously to work at this process for the reproduction of negatives for the photo-mechanical work. I had dabbled in the 'dusting on' process before, and had even reproduced with fair enough success one or two negatives, but I certainly could not boast a knowledge sufficient to enable me to reproduce negatives of quality equal to originals and with any degree of certainty, especially as the greater part of my dabbling had been in the way of making opal positives—certainly the most fascinating form of the art.

I believe that most formulæ for the powder process are unnecessarily complicated. In fact, unless there is some distinct object for it, it seems to me that a formula for the powder should contain, besides the water and the bichromate salt, only two substances, namely, a colloid substance and the hydroscopic substance that gives the colloid the power of causing the

powder to adhere to it. I was, therefore, pleased with the simplicity of a formula given in one of the articles above referred to, in which there was mentioned only water, bichromate of ammonium, common sugar, and gum arabic.

On trying this formula I found it a remarkably workable one, except in one particular. The solution was too thick to give that very delicate film that always appears to work best with the powder process. Water, however, was all that was necessary to remedy this, a little alcohol added was found to be a further improvement, causing the composition to flow over the glass more evenly than it otherwise would. All who have worked the powder process must have found, at first at least, a difficulty in getting an even film. By making up the mixture in two stock solutions it will keep for a very long time. Enough for the day's work is then mixed up, and there is not the temptation to keep on using a solution after it has perhaps got beyond its best.

Here are the two stock solutions as I now mix them :—

A.

Best quality gum arabic	1000 grains.
White loaf sugar	1000 ,,
Bichloride of mercury	5 ,,
Water	40 ounces.
Alcohol or methylated spirits	10 ,,

B.

Bichromate of ammonium	2 ounces.
Water	20 ,,

The reason for adding the alcohol has already been given. The quantity mentioned is well within that which will coagulate the gum. The object of the bichloride of mercury is to preserve the gum from decomposition. Bichloride of mercury is a remarkably efficient antiseptic. It may be omitted altogether by those who do not wish a solution that will keep for a very long time, and it might of course be replaced by any of various other antiseptics.

The two solutions are very thoroughly filtered. This is quite essential. Before work, any quantity of solution needed is made up by mixing three parts of A to one of B. For opalotypes I prefer to dilute even this very weak solution with one part of water to two parts of the mixture.

In reproducing negatives, a matter of the greatest importance is the powder to be used. Obernetter, who was the first to use the process on a large scale for reproducing negatives, recommended the use of the finest quality of levigated graphite, and it is probable that nothing quite equals the results of this powder, especially when it is desired to imitate very exactly the appearance of a wet plate negative. Nevertheless, I have succeeded very well with all of certain black pigments, such as lamp black, ivory black, &c., and specially well with a pigment which I buy here (in Japan), which I at first took to be the finest quality of lamp black, but which I am told is violently poisonous. It gives an image quite black by reflected light, of a very rich, deep brown black by transmitted light. The price is about a shilling a pound, but the vendors will give me no further particulars about the stuff further than that it is poisonous. It is my impression that I am right—that it is really the lamp black used for

making Japanese ink, and that all about poison and so forth is meant for mistification.

Now for the exact manner of working. A piece of patent plate, or other flat glass, is polished as for the wet-plate process. It is then slightly warmed and is flowed with the composition, which, if it has been made up as described, will flow like collodion. The plate is drained so as to leave as thin a film as possible, and is dried by the aid of heat over a charcoal or other clear fire. The heat should never be greater than the hand can bear or the plate will be pretty sure to give a dirty or poor negative. The film when dry should be so smooth and thin that the plate has the general appearance of a sheet of very faintly yellow-flashed glass.

Whilst the plate is still hot it is placed, film to film, in contact with the negative to be copied, and the exposure immediately begins. The best results will be got by exposing in direct sunshine with the plane of the negative at right angles with the direction of the sunlight. A word as to the sort of negative that copies best. I have had the best success with negatives of about average density, but have had no difficulty with those that are on the thin side so long as the detail was all in the negative. There is no difficulty in getting a negative a great deal denser than the one that is being copied, a thing that is of the greatest use in copying line-subject negatives. On the other hand, it has been difficult to get negatives of as good quality as I had thought would be possible from those on the over-dense side. If the exposure is pushed to get detail in the denser parts, the lights will not take the powder at all, and there is want of detail in these. If too short an exposure is given, the denser parts get smudgy or get over dense.

A little experience is necessary to learn the correct exposure. I find it generally safe to leave the frame out till a piece of ordinary sensitised paper turns to a deep brown.

On taking the plate again into the dark room, a faint image will be seen. The plate is warmed and powdering begins. This is naturally the part of the process that needs the greatest skill. With small negatives there should be no great difficulty. With large negatives considerable practice is necessary to prevent unevenness in large areas where there is a uniform tint or a fine gradation—in the sky of a landscape, for example. A soft camel's-hair brush is necessary for spreading the powder, and if the negative is large this brush must be large.

In powdering, the object to bear in view is to keep a considerable quantity of powder on the surface of the plate, and to keep it always moving rapidly about. It must not be allowed to rest on any spot, or smeariness is likely to be the result. When this is said, almost everything is said but that the rest must be gained by practice. Above all things hurry should be avoided. In certain conditions of the atmosphere, if the plate has been warmed only to a slight extent, the image will begin to appear at once, and density will be gained in a minute or two; but in most cases the image will begin to appear only when the plate is nearly cold, and patient dusting may be necessary to bring up density. Obernetter used to recommend breathing on the plate to hasten matters, but I have almost always found smeariness to result from such a practice. With patience in this country I have never known any difficulty in getting density, but if I were working in an exceedingly dry climate and could not get the powder to take, I should add a little more sugar to the composi-

tion and, if that would not do, a little glycerine. When the needed density has been got, all powder still on the film must be brushed off as quickly as possible, and plain collodion must be flowed over the surface. The plate is then washed till all 'greasiness' is gone, and is placed in a saturated solution of alum till there is no longer any yellow colour left. It is then simply washed, if a reversed negative is needed, as is the case commonly for photo-mechanical printing. If an unreversed negative is needed, the film must be floated off and turned over and again floated on the plate. This sounds formidable, but is in reality a thing that it is very easy to do. The collodion ought to be thick and 'tough,' but I have found no difficulty working with Thomas's negative collodion—uniodised of course—which I have used simply because it is practically the only collodion commercially obtainable here. As a rule, if the plate be merely allowed to remain for half an hour in water, the film will detach itself. If it do not, the addition of a little of almost any acid will cause it to do so. It has then only to be turned over and to be floated on to the glass, when a direct negative, which should be equal in all respects to the original, will be the result. Of course, whether the film be reversed or not, varnishing is not optional, as with gelatine plates, but necessary, as with collodion plates. A film negative, strong enough to stand all ordinary wear and tear, if treated with a little care, may be made by coating the glass with a preliminary coating of collodion, then proceeding exactly as described.

I find that I have far exceeded the limits that I had set myself when I began to write, and yet I have not given all the details that I wished to of even one of the applications of this universally applicable and most fascinating process. Let me conclude by recommending the 'dusting on' process to the notice of those amateurs who are fond of a process in the application of which it is possible to exercise an indefinite amount of skill and ingenuity, and which appears to have no end to its possible variations.

DEVELOPMENT IN RELATION TO EYESIGHT.

By W. Hanson.

Perhaps it may safely be taken for granted that no one who has felt the inconvenience, not to say the pain, of coming out into the daylight after having been two or three hours in the so-called 'dark room,' will question the great importance of being able to admit more light into it during the process of development. Eyesight is a very precious boon, and anything that tends towards its preservation surely is worth considering.

By common consent pyro holds the field against iron as a developing agent, but why it does so is not apparent, seeing that the solution of the latter has a quality, not possessed by the former, which is of great value, namely, its deep orange colour ; for it so effectually stops off the actinic rays that an exposed plate may safely be developed even in diffused *white* light, provided that the plate be *immersed* in the solution before the *white* light is allowed to fall upon it. Hence it is fairly concluded that if this agent were to take the place of pyro, a very much larger amount of light, less trying to the eyes, could be admitted into the developing room, and so a dangerous (and seemingly useless) condition of development done away with. Should it be objected that pyro is the

better developer of the two—and perhaps, further, that hydroquinone is likely to supersede both—and this really be so, it would be well to colour these solutions by the addition of some suitable agent, so as to give them the power of protecting the film against the action of light as effectually as that of the iron does. I have made a trial of burnt lump sugar for this purpose, and find it to act fairly well; but other things may be found to answer better, for colouring agents are numerous, only in selecting one preference clearly should be given to that that does not *dye* or *stain* the gelatine film.

NOTES ON SILVER PRINTING.

By Wm. Bishop.

Judging from the 'replies to correspondents' in the photographic journals, and the inquiries which constantly appear in the records of photographic societies, it appears that among the present generation of amateur photographers there exists an ignorance of some of the first principles of silver printing which is at times surprising to those who knew and practised the art before the days of gelatine. The ignorance need not be a matter of surprise, however, when the different conditions of past and present are considered. In the past every photographer, amateur or professional, had to do his own work, and found some of his most pleasant experiences in dealing with and overcoming the difficulties which lay in his path. In the present, with the facilities for having everything done which have grown up side by side with the progress of photography in public favour a distinct race of amateurs has appeared who are photographers but in name. Some are content with merely getting negatives, 'pretty negatives,' forgetting that the negative is but a means to an end, the making of a picture which shall be a joy to all. Others are content with simply exposing plates, leaving development, printing, mounting, and finishing altogether to professional hands, not, however, forgetting to claim the results as their own productions, at exhibitions or in private; while a third and large class merely put out their printing as being too much bother. With the influence of these classes, and the introduction of platinotype, bromide papers of all kinds, and the various other modes of printing which each in turn has threatened to 'hold the field,' the old-fashioned, and still generally loved, silver printing has not received the study and attention of amateurs which it still deserves, and when it is tried, as a change, the old familiar difficulties crop up again and again as though they were something new.

It may be, therefore, that a few hints from the note-book of practice may in this connexion be useful, and 'old hands' will no doubt pardon the filling up of space for the help of others.

Every finished silver print, then, has gone through the following stages: Preparation of paper, printing, toning, fixing, washing, mounting and rolling, burnishing, or enamelling. Let us take them in order.

Preparation of Paper.—To amateurs I would say, 'Don't.' Choose a commercial sensitised paper known to give good results, and stick to it. There are slight variations in different makes as to depth of printing and quality of tone, but if one brand be adopted there will be more certainty of result.

Printing.—No care will make a first-class print from an inferior negative, but among good negatives differing treatment will be necessary. Some bold, sharp, crisp negatives will bear direct sunlight, and bear it well. The majority will print best in diffused light, and a screen of ground glass over the printing frame is often handy and valuable for softening the light for a weak negative. Print a little deeper than your finished result is to be. It is not possible to say how much deeper, but experience will soon show what the particular brand of paper needs.

Toning.—A bath which I have used for several years and can strongly recommend is as follows:—

Chloride of gold	15 grains.
Acetate of soda	150 grains.
Lime water	15 ounces.

Place bottle containing solution in cold water and heat to boiling for a few minutes; when cold, dilute as needed for working bath by adding to each ounce four grains of carbonate of soda, and eight ounces of water. This bath keeps well and improves. It should be used warm, from 70° to 100° Fahr., and prints should be placed in it direct from the first washing water, it seeming to be important that there should be some free silver, as the first prints are frequently a good while toning, while later on the working becomes very rapid. The tones will range from a rich warm brown, through all the grades of purple, to slate colour, and when the desired tone is reached the print should be removed to a basin or tray of slightly salt water, which stops the action of the toning.

Fix in hypo bath, one to five, for fifteen to twenty minutes, and be sure to give plenty of it, certainly not less than one pint to each sheet of paper. I believe firmly that the principal cause of fading is here; water will remove soluble salts, but will not remove the insoluble ones produced by a scanty supply of hypo.

After fixing comes the washing, on which opinions differ. I prefer to err on the side of thorough washing, first in warm water, then in repeated changes of cold for an hour or so, with a final good wash in the morning, after soaking in plenty of water all night. I have had very little experience of fading, and I believe the reasons to be, plenty of hypo, and plenty of water.

The next process is the mounting. If the prints were trimmed before toning, as they should have been for reasons of economy, convenience, and reduced risk of tearing, they may either be mounted wet, or dried first. Mounting wet inevitably means cockling of the mount, and rolling this out means distortion of the picture, so I prefer to mount dry, and when it is practicable, in the following manner:—When the prints come from the washing and have been partially dried in blotting paper, I starch them all with stiff white starch paste, squeezed through fine muslin when cold, and then lay them on a canvas-covered frame to dry. After they are dry I as quickly as possible starch them again, and lay them on the mounts, rubbing down quickly and putting to dry. The effect of the double starching is to produce an immediately adhesive surface, which can be attached before the paper has had time to stretch, and cockling is thus avoided. Glue, gelatine, varnish, indiarubber, all have their advocates and have their good points as mounting media, but I am only speaking of what I personally find the most successful,

When dry the mounted print has to be finished. If mounted damp and dried with a good curl in it, the edge of a paper knife smartly applied along the back, will take the curl out, and a turn or two through the rollers will give finish enough for most people. If the press has a steel plate for hot-rolling the surface will be better, or a burnisher in good condition will make a higher gloss still, only in burnishing be sure that the bar is hot enough. Good starch, and a really hot burnisher seldom need any lubricant, but if one is desired, a little dry curd soap rubbed on with a piece of soft flannel, and left a little while to ripen, should answer all purposes; or a solution of four grains of Castile soap in an ounce of alcohol will be found useful.

A word about enamelling. As fine a surface as any enamel may be obtained by laying the wet (thoroughly wet) print face down on a sheet of glass, free from scratches, which has been well cleaned and polished with French chalk. After laying down take off the superfluous moisture from the backs with a blotter and rub well down with a squeegee or with the hand, with a sheet of paper between. Look through the glass for air bubbles and rub them carefully out. When quite dry the prints will come clean away and may be mounted in the manner usual with enamelled prints, with hot glue, by the edges only.

My words have been simple. I hope they are plain, and may help some hesitating brother to become his own printer. A parting note to all readers. Always keep a cake of 'Sapolio' on a convenient shelf. In addition to its usefulness for general household purposes there is nothing to equal it for cleaning developing dishes or opal plates, while for taking the troublesome 'extra' emulsion from the backs of negatives after they are dry and safe to handle it is just the 'one thing needful.'

THE CAMERA ON TOUR.

By W. F. Field.

Perhaps it may be as well to preface my brief contribution by stating that if it will prove useful to any tyros of the black art, if it will afford intending tourists even a modicum of information, it will have more than answered its purpose.

It was in August of this year that the idea occurred to me that a trip abroad might be the means of considerably enlarging my collection of views. For several days I cherished the fond idea, and even went so far as to pack up my camera, when, glancing through the columns of one of the dailies, I learned that a tourist who had recently returned from abroad had the whole of his valuable store of negatives spoiled through the inquisitiveness of the Custom-house officials.

Then, I admit, my projected tour did not wear such a rosy appearance. I believe it is an acknowledged fact with provincial theatrical managers, 'When in doubt, play *East Lynne*.' When, however, I am tortured by misgivings, I invariably turn to the pages of this Almanac. On this occasion I followed up my custom. What I wanted was a portable developer that I could carry with me without fear of broken bottles and stained linen. I was convinced that if I could find this I might snap my fingers at the whole fraternity of *douaniers* by developing each batch of plates at night. The Almanac did not play me false, and in the end I found the

identical formula. This settled I looked through my faithful *Baedeker*, and in the end decided on the Rhine.

Wasn't it Tom Hood who said, 'Don't wash or be shaved; go like wild men; play dominoes; smoke, wear a cap, and smock-frock it?' I am not a Beau Brummel—far from it—but, even at the risk of extortion at the hands of German hotel-keepers, I resolved to adhere to my usual garb, and leave the rest to fate. Accordingly I packed up 3 dozen Ilfords (extra rapid); half-plate camera, lens, and shutter; 4 dark slides; ruby lamp; finder; tripod, &c.; 8 ounces of sulphite sodium; 8 ounces of common soda; 1 ounce of pyro (dry); 8 ounces of alum; 8 ounces of hypo; and two sheets of ferro-prussiate paper. This comp'eted my kit.

Leaving London by G.E.R. at nine p.m. from Liverpool Street, I reached Antwerp soon after ten the next morning. *M. le Douanier* eyed my Gladstone suspiciously, but on producing plates which I had previously labelled, 'PHOTOGRAPHIÉ,' I was permitted to pass. From the Quai I made my way to my hotel, and, having lunched, proceeded to prospect round.

'The Stren Prison,' on the Quai (now in course of demolition), was the first view. From here I crossed to the Cathedral, where I succeeded in taking a couple of the main building, including in the picture the celebrated well of Quintin Matsys, the artist blacksmith. For a franc (judiciously bestowed) permission was granted me to try 'a shot' at one of the dogs—a fine creature—who was ignominiously chained to a coster's truck. The canine beast's lot on the Continent is not to be envied, and the S.P.C.A. would find plenty to do there. Reserving my other plates, I returned to my *ménage*, and at night I developed them.

As already hinted, the developer is the tourist's *bête noir*, yet if the difficulty is surmounted it renders a trip a genuine pleasure. Here, then, is the formula, based on that given by Rev. W. Holland in the 1877 ALMANAC, and I take the opportunity of thanking the rev. gentleman for a particularly useful combination:—

Sulphite sodium	½ ounce.
Washing soda	½ ,,

Dissolve in 8 ounces of water. For each plate to be developed take 1 ounce of above, add 2 to 3 grains of pyro (dry), and develop and fix in the usual way. This done the liquids may be thrown away, and on waking next morning the negatives were ready for storage.

Anxious to economise time, I booked early for Cologne. At Aix-la-Chapelle half an hour was allowed for lunch. This gave me an opportunity to take a picture of the Market-place, which certainly repaid the trouble. Shortly after six o'clock we steamed into Cologne station. Selecting an hotel near the Cathedral, I dined, and wandered forth across to Dentz, where the students and wine-bibbers do congregate. To discourse on the effluvias of the city would be to chronicle the death of Queen Anne. They are, however, far from pleasant. Next day I explored the Döm, or Cathedral, and endeavoured to get a view, but was unsuccessful.

I next made my way to the landing-stage and booked for Bingen. The tickets allow of a break at each station *en route*, and the saloon accommodation is extremely good. From Cologne to Bon there is practically nothing striking. From Bon to Königswinter is but a few hours, and here I halted for the night. Leaving the bulk of my goods and chattels

at the hotel, the ascent of the Drachenfels was the next feat attempted. There were several donkeys at the base, and I resolved on testing their mountaineering abilities. Accordingly I hired one of the quadrupeds, and started. Whether the asinine brute resented my pack I don't know, but the eccentricities of the animal more than once brought tears to my eyes. Half way up he stopped, and, in spite of coaxing and protestations, refused to budge. Happy idea! I would get off and lead him a little. I did. The moment he found himself no longer encumbered he galloped up the mountain's path, while I followed behind. Eventually he stopped to regain breath, and a small branch happening to come into my possession I overtook him, and held an 'animated discussion' with him of five minutes. Then he *went!* 'Went' but feebly expresses it; he flew! So did I. Arriving at the summit I handed him over to a boy, who promised to see him back to his master.

The castle on the height, immortalised by Byron, was not to be missed, and the panoramic view also sacrificed at the altar of King Sol. Having secured that I descended, and spent the evening pleasantly wandering in this delightful little Rhine village.

Next morning I continued my journey to Coblentz. By kind permission of the captain, who, by the way, proved an excellent fellow, I fixed my tripod on the summit of the paddle-box. On either side of the river were dotted pleasant villas, country mansions, and extensive vine plantations. Occasionally a ruined castle met the view, and in an amazingly short time I had exposed half-a-dozen plates.

At Coblentz I halted for the night, and the following morning made my way across the Bridge of Boats, and climbed to Ehrenbreitstein—a superb fortress—by no means unjustly termed the Gibraltar of the Rhine. This done, I crossed to Asterstein, and here the view proved so enchanting that I resolved to 'catch' it. I had focussed, and was just preparing to uncap the lens when a couple of fierce-looking grenadiers appeared on the scene, and, without a word of warning, marched me off to the citadel, where I was interviewed by the commandant. Explanations followed, and in the end I was liberated, not before I had promised never to offend again.

Deeming it indiscreet to stay in Coblentz longer I took the next boat, and again 'fixed' upon the paddle-box. A gentleman on board recommended me to stop at Capellen and photograph the Castle of Stolzenfels, but time being an object the advice was not acted upon.

Boppard was my next landing-stage. Here I took views of the Pfarrkirche and the Marienberg, a very fine building devoted to the interests of hydropathy. Anxious to carry home with me a few pictures of forest scenery I availed myself of the diligence to Simmern, and walked on to Fleckertshöhe. While changing horses at the former I photographed the conveyance, but it did not prove a *chef d'œuvre.*

Returning to Boppard that night I devoted the evening to developing. Next day the boat took me on to Bingen. The Mouse Tower, in the middle of the stream, made a capital picture. Soon after two Bingen came in sight, decidedly one of the prettiest riverside villages I had met. My stock of plates getting less, I crossed the ferry to Rüdishiem, and intended to get a picture of the National Monument. A railway carried me to the top of the Niedervald, where I at once proceeded to erect the camera. Here again the German red-tapeism became apparent, and a

police officer peremptorily ordered me off. In vain were all expostulations. If I persisted he should take me into custody. Even the potent agency of a 'tip' failed here, and in the end I was compelled to abandon the idea.

Next day saw me at Eltville, where there is a quaint old church, with a Renaissance monument. The champagne factory also proved interesting. From Eltville I booked by train to Biebrich. From here an omnibus carried me to Wiesbaden. An exceptionally beautiful city this. I tried the waters, but cannot say they proved particularly refreshing; *Chacun à son goût.*

Here I took views of the theatre, with the statue of Schiller in front; the Cursaal, with its crowd of promenaders, and the Market-place. Then, as my stock of plates was exhausted, I packed up my goods and made for home. Travelling by express boat that left Biebrich at nine, Cologne was reached at four, Antwerp eight next morning. The G.S.N. boat found me comfortably ensconced three hours later, and England was reached without mishap of any kind. The English Custom-house officer insisted on seeing my plates, and it was then I metaphorically shook hands with myself on the score of development.

To those in search of a pleasant and instructive tour the itinerary here given may be useful.

WET COLLODION *VERSUS* GELATINE.—A PLEA FOR THE FORMER, BOTH AS TO THE MANIPULATION OF NEGATIVES AND THE RESULTS TO BE OBTAINED THEREFROM.

By W. Harding Warner.

I address myself in this to old workers who, like myself, remember with pleasure the beautiful results we constantly obtained from our collodion negatives. The great outcry about the bath, and dirty fingers, and stained clothes, may have occurred to a few, but to those who worked regularly at it it was never thought of, and the picture when obtained was done with, and the result was known at the time. It must not be supposed that I decry gelatine; that has its good as well as bad points. But placing results one against the other, it cannot be denied but that collodion beats gelatine, except in a few exceptional instances. Gelatine is more convenient, but is more trouble. We can do more as to quantity, but is it better? Just let us compare the two. In collodion we used, as a rule (landscape workers), patent plate of a given thickness. Do we get anything like this in gelatine? Then, again, we bought our collodion of a recognised maker or makers, and blended them together, and we knew of what it was composed, and how sensitised. Do we know this with gelatine? Again, we could keep our collodion until ripe, and of the proper colour, and we could clean our plates ourselves, omitting those with bubbles and scratches, all of which tended to mar the result. Can we do this with gelatine? Then as to exposure. With those of us who understood the nature of our plates this was no guesswork. We required no tables of calculation; we judged from the colours presented to us in the subject what our exposure should be—*i.e.*, we could value the spectrum at so much; we worked for that result, and we obtained it. Do we do so now with gelatine? and if not, why not? Then, again, in develop-

ment, we had one fixed formula—iron, or pyro—made up in different ways, but all tending to the same result, and to those who went in to succeed success was sure; then in fixing we completely eliminated all bromo-iodide from our negatives with cyanide, and with a thorough washing the plate was completed, and became a thing of beauty, lasting for numbers of years. Now I would draw attention to one or two points before concluding. With collodion plates we used a bright yellow sample, which was made sensitive by a rich coating of silver, which, when thoroughly drained and kept in the dark slide three or four minutes to allow the excess of sensitiveness to go off, gave—on exposure to 'a dark green river subject made up of overhanging rocks, trees, and water, with but little sky, and that in between the branches,'—a perfect negative full of gradation and half tone, even to the colour of the rocks in the river—(the pictures I can show)—and the reason of this was, that in the colour of the collodion allowance was made for equalising the varied colours of the subject, which effect is now sought to be obtained by orthochromatic plates, and a yellow screen behind the lens. Thus I think collodion has in this instance the best of it. Again, in the development of our dry plates, either in development proper, in the aluming and washing, and fixing and washing after, there is a great chance of galvanic action playing its part, either in the washing trough or in the soaking in of the salts into the film, where, from their not being thoroughly eliminated, they act and react upon exposure to light until the subject becomes clogged up. The red spots so often found on plates, and supposed to be the result of imperfect fixation, have been produced at will by the writer, and distinctly traced to galvanic action—although the plates were fixed for a long period of time (an hour) in a perfectly fresh solution of hypo in a glass bath—and this not with one, but with many plates at various times. Now if we are to obtain negatives approaching in purity to those of our wet collodion days, we must use a colourless gelatine, and must develop it in a non-conducting tray, and alum, fix, and wash it in such a way that every particle of dirt and dust shall be removed from the plate as well as the chemicals, and that solely and only by the action of the water, rubbing or scrubbing the film on the plate without damaging the same in the slightest degree. Simple apparatus for fixing and washing plates thus will shortly be in the market, as well as a syphon on a new principle, that shall continually keep the water pure by discharging every particle of dust, dirt, or salts contained therein, and fix and wash plates in a much less time than at present. *Verbum sap.*

INSTANTANEOUS SHUTTERS.

By A. E. Bannister.

'Exposers' say the clever man; but as the lens is by it shut as well as opened, we will stick to the good old name. Of course 'every one' knows 'all about 'em'—that's conceded without parleying; if you, dear reader, should be one, give this article a wide berth, as probably I only give what Jonathan would call the experiences of an 'orneray cuss. However, here they are for what they are worth, first premising that our opinion up to the present date is that the ideal shutter for every one and every purpose has yet to be brought out.

Years ago, long before Lancaster's, Cadet's, or Chadwick's, showed up, we experimented on the disc form, with a *disc*-overy too. After careful trial, we pronounced it a failure for several reasons. Firstly, because however lightly made, it would shake the camera (a *very* light whole-plate) when held in the hand. Secondly, because if made very lightly it would upon occasion (*the* occasion always) stick fast half-way, or refuse to move at all. And thirdly, my brethren, lastly and not leastly, if it worked smoothly, still no reliance could be placed upon it, for the following reason :—In all ordinary disc patterns the shutter opens on one side and closes on the same, thereby changing the 'entering' position, if we may so call them, of the rays building up the image. A moment or two's experiment is interesting. Fix camera securely, and focus carefully (focus glass reversed), say, a window frame well in the foreground. Pencil outlines of sash on screen; put on shutter and slowly rotate same, when, hey, presto! the sash is seen to move away from pencil lines, in company, mayhap, with the owner's faith in that pattern shutter. The same thing can be done with any ordinary drop (single curtains are drops), the same principle being involved in all. Of course these forms answer very well sometimes, but are not a success when the principal object is close up.

The next offender pounced upon was the go and return—Lancaster's, Watson's, &c. This form looked promising, but however lightly made, its very principle (with our light camera at any rate) made it impossible to prevent vibration.

Next under trial came the flap and drop—Branson's, &c., which we reluctantly had to reject, being apparently possessed of the same amiable qualities.

Then came open from centre, and close to centre—Noton's, *alias* Sands & Hunter, Fallowfield's, &c. This pattern promised well. The motion was smooth and easy, all shake was avoided, and given certain conditions, was considered one of the best types tried. These conditions were that for a whole-plate picture a 10×8 or 12×10 lens must be used, as it was found in anything like rapid work the principle of centre opening did not allow the light to reach the edges of the plate quickly enough. This alteration of lenses, however, was rather inconvenient, as increased focal length meant using, say, 10×8 or 12×10 camera for whole-plate pictures. We are writing, of course, only of shutters in front of lenses; betwixt meaning too many shutters to carry.

Judgment was next pronounced on the double-flap system—Guerry's, Furnell's, &c., and of all tested the latter, Furnell's, received the most favourable opinion. It was very small, gave a large amount of light, did not shake, and finally could be adjusted to almost any speed. Foreground and sky, too, could be arranged for as required.

Various other forms were studied; some of the double-sector pattern, like Addenbrooke's, some of them about the size of an ordinary stage side-wing, but no special points of vantage were discoverable. Our choice, therefore, lay with the open from centre and the double flap, both of which in our hands have proved themselves good. Given the lens larger than plate, and the length for working, for non-shakeability, &c., there is not much difference, but for light-grasping power and for speed regulation the double flap seemed the best. We have ignored numberless styles of shutters working in diaphragm slots—Grimston's, &c., as they are most too delicate, as well as being very awkward for the

finest class of lens for instant work, the single meniscus. The conclusion we drew from our experiments was that the 'Ideal Shutter' should be small, light, not easily damageable, simple, capable of opening and closing in a minimum of time, with a maximum of exposure, as well as being easily adjustable in regard to both speed and exposure of foreground and sky. We have most of these difficulties solved, but still not all; there's room still left for enterprising patentees. It is quite probable that some of our shutter makers not recommended above would like to carry us home on one; but we only give result of our own experiences, not theirs, so that we are in no way prejudiced in favour of any particular one, and leave our readers to test for themselves.

EASY INTENSIFICATION OF ANY PORTION OF A NEGATIVE.

By G. W. Valentine.

A very simple way of increasing the density of any portion of a negative is to mix some of Judson's yellow or orange dyes with half an ounce of gum Senegal, and apply thinly with a camel's-hair brush moistened with saliva. It adds enough density to parts of the negative required without shutting out the detail.

A SPECIFIC FOR RESTORING THE COLOUR OF UNTONED SILVER PRINTS.

By H. C. Carruthers.

Few things are more vexing to an amateur who has little time at his disposal, than the discovery that the prints made with such care ten days or a fortnight previously, when taken out to be toned, are the colour of ancient parchment in those parts which should properly be white.

With me, as with many others, until a short time ago, such prints usually found their way into the waste bag as past praying for.

I find, however, that if the photographs are placed immediately before toning into a bath of about one part of strong ammonia to fifty of water, washed in a similar bath after toning, and about one part of the same useful chemical be added to fifty parts of the fixing solution, that when ready to mount the whites are invariably restored to their pristine purity.

This remedy is, so far as my experience goes, quite unfailing, and so ridiculously simple, that I venture to send it to you, strong in the faith that I am performing a religious duty in removing the occasion of considerable profanity.

A DARK ROOM FOR TOURISTS.

By B. B. Fuller.

I have often come across tourists who are perplexed about changing their plates on a holiday trip, but I think the following suggestion easily fulfils every requisite effectually, although it may appear rather laborious after a long day's ramble.

I myself always pick out a bedroom with as small a window as possible, at which, with the help of a few drawing pins, say half a dozen,

I fasten a piece of ruby medium to the window frame, over which I let down the blind; I next take the counterpane off the bed, and with three or four rather larger drawing pins than those used for the window, fasten it to the top of the framework of the door, letting it fall to the ground, quite close to the door, so as to cover up the crevices at sides and bottom, which it will do quite easily with a little arranging; be careful to lock the door first, or some unexpected visitors may appear and let in the light. You have now a perfectly light-tight room, which with the aid of a little portable lamp, made of ruby medium, and which costs about 3*s.* 6*d.*, placed on a chair near a table or bedstead, on which to place your plates and boxes, affords a very easy and efficient means of safely changing any number of plates.

I generally take a yard or more of medium, which I strap on to the camera legs, using the same straps; the pins I push into a piece of wood (ordinary firewood will suit) to protect and keep them together, and these with the lamp I pack in my camera case. If the medium is not enough the focussing cloth will generally fill up the want. I have found the above very satisfactory, enabling any number of plates to be changed in the middle of the day with the utmost security, and the extra weight is a mere trifle, say a few ounces, added to one's ordinary luggage on the journey out and back to town. One word more: don't let your landlady know too much about the counterpane business, as she may object.

BLOATER LAND.

By T. Coan.

The sturgeon is fish, flesh, and fowl. Yarmouth is fish. Its cries are 'Fine bloaters!' which are fine, not large, but plump. Its commerce is fish, and fish only. The predominating smell is unmistakably fish—very fishy. In fact, Yarmouth is a flat plaice, full of rows, with floundering cobble pavements, irritating to those shod with light soles and 'eels. Fine kippers and red herrings most likely may be undergoing the curing process in an adjoining premises. The oak-tree, when growing in the lane or forest, is both majestic and pretty, but when used as firewood to cure the fruit of the seas its function is widely different and nothing so nice.

Those who like the herring had better interest themselves to see them preserved. You will be expected to 'stand your footing,' therefore take a fair supply of copper money, which comes cheaper for general distribution than silver. The correct thing (and one must do as Rome, &c.) is to carry away a few of the sprats on a twig, and pretend you feel both pleased and delighted with the bargain. Look out for dogs or you may go home with twig minus the fish. Take a lesson in cooking. Watch how the dear old landlady (all 'landladies' in Yarmouth, no 'lords) carefully opens the young gentleman's back, removing bones and other unnecessary interior decoration work easily and pleasantly dispensed with by the consumer. It is then laid flat open on the gridiron and grilled.

Make Yarmouth your headquarters, your starting point, and decide what party you are, what pleasures you wish, and arrange accordingly. You are located in the midst of a compound very varied. You may partake of two extremes in the question of noise *versus* quiet. The bustle, mob, and noise is conveniently sandwiched on the beach between the two

piers—Britannia and Wellington. Here you may receive special attention—photographic attention. The 'gay photographer,' looking anything but gay; possibly disappointed with often having to give '9 for 7½.' He is now ruled by the iron thumb of the Town Council, who impose a tax of five shillings weekly, and a like sum for each extra man he may employ as tout.

Quite a mob of shabby cameras on shaky legs stand in a line within a short space of distance. Evidently the 'photographic artist' is not happy! His peace of mind is now and again disturbed by some ill-used visitor writing a strong letter of protest to the local paper, who, against his or her wish, had been light-graphed, and not caring to hand over the necessary shilling 'for lot complete' found their picture (?) publicly exhibited 'on the line' of the 'gay' one's specimen frame. So elevating a position not being to their wishes, often brought the purchase money, to the disgust of the sitter and delight of the operator. The latter once more, with good heart, repeats the dodge among others.

This sort of thing has been much practised by a small clique of black sheep, that to-day it is difficult for honest, straight, business men to win back the good opinion and confidence of the general public. The beach work gives but a scanty, hard half-living to those who are obliged to work it. Even now the people are very shy of this particular pleasure. It is a pity some touts will pester most unlikely subjects. It becomes a nuisance. The same may equally be said of others, as hawkers, beggars, niggers, try-your-weight, blow-your-lungs, or extend-your-chest men. Such innocent, happy pastime is better understood and relished at a distance. Greater the distance, the more the pleasure. German bands and organs full on at the one time is not a kind of mixture to mingle with careful reading. In fact, reading at a place of this kind is always a failure. Books may serve the lounging young lady to watch passers-by from behind its cover, and the only purpose *it will* serve. The best book for the general use of the male person is a cheque-book.

This part of the beach contains a little multitude of so-called amusements. Stationed stall shops are selling goods eatable, drinkable, and presentable. They cater for all tastes, and anything may be had between pickled mussels and fried fish to the more cooling and refreshing 'hokey-pokey,' while quiet, business-like, young lady saleswomen will sell you the shells of the sea—procured many miles away.

Stall-owners shouting; bands, niggers, hurdy-gurdys, clanging, singing, gesticulating; donkey owners chasing asses with living freight everywhere and anywhere; boatmen bellowing, with voices loud and heavy, 'A sail! a sail! a sail!' open-air concert singing; vocalists in character of the bumpkin, all red hair, rags, and tall hat, banging a big stick, inviting the whole audience 'to go' the chorus once again—and they do with great *forte*—all this is small compared to the buzz of the thousands of visitors, many down only for the day, starting before the rising of the sun to spend a happy, jolly, 'rare-go-in,' seven hours by the sea, returning home late, fagged (and no wonder) for the next few days. All this confusion rests on but a small portion of the beautiful, soft, sandy stretch. You pass rapidly on, and beyond the Britannia or Wellington piers the crowd grows marvellously less, more quiet and select. Little groups of fathers, mothers, and children, taking their pleasures enjoyably and comfortably. No beach, I think, can equal this; for young

folks here, with their little dresses tucked up, may dabble and wade in delightful shallow pools, clear of all danger. The boys may sail their boats, shrimp with miniature nets, or build castles of sand. To one who takes his wife and family to benefit them and an idea to amuse himself with camera work for his own particular joy and comfort, and to know he may slip away for a few shots and leave the little group safe from harm's way or molestation, is in itself a boon and comfort.

Now fine pictures are to be had in Yarmouth. The harbour is grand. The immense amount of shipping always there affords fine opportunities. Get down by the fish market and watch unloading of the fish. Here are men in their correct garb and natural surroundings. Smacks are close in, giving every chance to the camera. Lower down you reach the harbour mouth where, without exception, no position could be better adapted to instantaneous working and suitable subjects. Here you have vessels passing out. Every little while you will see nearing from the far disance a tug paddle steamer, puffing along with black curling smoke issuing from her funnel, tugging as she is with one or more fishing boats well loaded with herrings, dipping deep into the water. You take position on the Gorleston pier and focus a spot where she *must pass* close to you; pop in your slide, see the shutter works without hitch, and wait. Nearer and nearer she comes, lashing the water with her paddles, struggling with the load. Now she rounds to enter, you draw your shutter; a few moments more she is straight and near to give a full picture, when click falls the shutter—to yourself, 'Thanks, very much'—and the job is complete.

Gorleston is 'so near and yet so far,' different in every particular to Yarmouth, only separated as it is by the river, but so widely altered. It is a place of sea, sand, cliffs, and quietude. Still, for children the old pier is rather dangerous should they go on. It is a very clean little place, and now contains less noise far than Cromer.

For picture making you must get up the rivers, and again it must be a question of what party you are. If a knot of jolly young sparks bent on fishing, shooting, sailing, and photographing, your arrangements may easily be settled. Should you want two or three weeks clear out on the water, hire a wherry and start.

It is said Norfolk and Suffolk have near 500 miles of inland waters, slowly rippling through the counties, passing the meadow, the marsh, and under quaint of the quaintest bridges. The natives hardly seem to exist; you suddenly come upon a small village with its peculiar, square, grey church tower, and you glide by unobserved. No one lives near you think. Should your larder run low you knock up the first farmhouse you meet and replenish at a very reasonable figure. Unless you search for them you rarely see people in more than ones.

You are alone on wild waters. Solitude and beauty. The essence of peace and quietness. Hush broken only by the splash of a jumping fish evading the ever hungry, prowling, pursuing, long-headed pike, or cry of the wild fowl you have disturbed as you plunge your boat among the high-growing reeds. Here the man of business may put on the pipe of peace and *feel at rest*. Away from bills, pass books, invoices, and discount. Beyond the telegraph messenger with prepaid replies, or postmen ever cramming your letter slot. Rest and contentment pervades the atmosphere, and you are at liberty to breathe quite freely.

Should you decide to run day excursions only from Yarmouth, then you are equally as well accommodated by the Broads as Ormesby. The rushes here grow tremendous. A short, cheap run by rail, then a pleasant sixpenny drive by road lands you at the 'Eel's Foot,' an old-fashioned inn, with big growth of marigolds large as sunflowers.

You hire your boat at the narrow landing stage, and find fish plentiful. Good roach and many of them, with a large number of pretty rudd, and once again, Mr. Printer, 'many of them.' I have taken large quantities of this fish here. You have your day's sport and find the trap waiting you to catch train for home once again,

Little Oulton with its Broad is reachable and nice. Fritton Decoy is very beautiful, with good perch. Should you have preference for river fishing there are stations all along the coast to meet your requirements. Both railway companies issue special cheap fishing and yachting tickets.

Acle is a nice little village, and a favourite of mine when river fishing. A good bed, dinner, or luncheon may be had at a remarkably moderate price, with civility free, gratis, for nothing, at the 'Queen's Head,' Mr. Mitchell, boss. He will not mind supplying just a modest cup of tea to a passing traveller who may drop in. You get a three-mile drive by trap (price as before) meeting all trains, and boats can be hired from either of the two inns on the water's edge at a small fee of one shilling per day. Take camera on this trip and secure a few of the passing yachts and wherries; include with same the one arched stone bridge in the distance. Mem.: When fishing, always carry a stout mackintosh; should it rain, you can be in no doubt it *does rain.*

Wroxham would be considered, I think, the queen of the Broads, if you allow Fritton Decoy to be the empress. Wroxham is pretty and useful—two good qualities. Here you can replenish eatables. If you *must* telegraph to your friends to say you have at last found a spot of habitation, you have a post office a few sizes larger than a large pill box.

Should you work on to Cromer, you will find it a grand piece of sea and beach, with most enchanting inland country about Gunton. The lanes are delightful; hedges crowded with wild blossoms, all colours and shapes, clinging ivy and ferns in abundance. Between here and Yarmouth are many small villages, *so small and so quiet*, tilted on the very edges of the cliffs. Maundsley is very taking and nice, with but a limited accommodation for visitors. Sea bathing is jolly here. To combine pleasure with a dip, borrow a large shrimping net from a fisherman and try your amateur hand at shrimping, and soon accumulate a bushel of this hoppy fish.

Castles are scarce in Norfolk. Caister, near Yarmouth, possesses a remnant which is effective when including the stream running beside. There are plenty of ruined churches, overhung with ivy, forming good goods for the knight of the tripod.

STRIPPING FILMS.

By George Mason.

Films are like any other new branch of photography: as long as the operations are unfamiliar and unknown, and one is but feeling his way, step by step, mistakes and failures must arise; but when worked at long

enough, and steadily enough, until the varied manipulations become familiar, it grows easier and easier, and the little worries disappear one by one—then the stripping film can be managed with as much confidence and ease as an ordinary dry plate, and with as much certainty of good results.

The developer that has given me the best results when working the Eastman films (which is the make I have invariably used), is as follows:—

No. 1.

Soda carbonate	4 ounces.
Water	32 ,,

No. 2.

Soda sulphite	4 ounces.
Pyrogallic acid	1 ounce.
Water	32 ounces.

Mix one ounce of each of these, and add one ounce of water when the developer is ready for use. With anything like right exposure the development of the film will be found easy enough, any amount of density being obtained where desired without trouble. After the negative is fully developed I wash it, and then pass it through a bath of hydrochloric acid, one part to twenty of water, for, say, one minute; this takes away any pyro stains, and also helps to make the paper strip off the back more easily. I again wash, and place in the hypo fixing bath. I have found some slight inconvenience when fixing, the white paper support, being so opaque, preventing me from seeing clearly when the negative was really all fixed out, but I got over that by leaving them so long in the fixing bath that there could be no doubt about their being fixed. After fixing wash well.

The next operation is to lay the film negative down on a collodionised plate. Let the plate be larger than the picture to be laid down, say, by half an inch all round, at least. Clean the plate then with a pad filled with French powdered chalk; rub it well all over, then remove any rough particles of chalk that may be on the plate by means of a flat camel's-hair brush. Now coat the plate with plain collodion, and lay aside for a little to set. After this place it in a tray of cold water, leaving it there till all the greasy lines have disappeared from the surface, and the water flows over it quite evenly. Then remove the collodionised plate to your work-table, take the film negative from the washing water, and adjust it upon the plate; it is not necessary to float the negative on the collodion plate in the water, as described by some—at least, I have found it very much easier to lay the film down on the plate where I am going to squeegee it. I use the smooth side of the indiarubber cloth next the negative when squeegeeing down, as it works much more smoothly than the other side. When in perfect contact the plate is put under pressure for twenty minutes, when it is ready for the next operation, which is to remove the backing paper from the film. This is done by placing in a tray of warm water the plate with the negative on it. In a minute or two the paper will rise at the corners, where it can be caught and stripped right off. In some cases it is difficult to move; when I find it so, I draw my hand over the back of the paper again and again, until it slips from its original place, exposing the film it had covered by about half an inch; then I take hold of the corner and pull it off. I have had

occasion to use water much warmer than is recommended when the paper backing is stubborn to move. In some cases I apply it almost at boiling point, and with success. When using the water very hot it should be poured into the corner of the dish, and let it flood over the plate, because if it is poured right on to the picture, it will make a hole through paper and film in a moment. When the paper is removed, wash in cold water and apply the stripping film.

Previous to application, the stripping film or skin is passed through a bath of cold water, to which has been added five per cent. of glycerine and a few drops of carbolic acid. Take the skin from the bath, and apply in the same manner as previously stated for laying down the negative, with this difference, that in this case the rough side of the indiarubber cloth should be used, for if you use the smooth side in two cases out of every three the skin will be found to adhere to the cloth, and not to the negative. When using the rough side, the operation is performed without difficulty.

After this they are set up to dry. When perfectly dry they are cut round and stripped.

Never remove them from the plate if there is the least feeling of damp; leave them till they are quite bone dry, for, although they will strip easily enough in their damp state, when free they dry up and pucker all round the edges, and it is impossible to get them perfectly flat again.

HYDROQUINONE OR QUINOL.

By Francis Cobb, F.R.A.S.

This chemical has come so largely to the front recently, that its merits are worth discussing as compared with those of our old friends, pyro and iron.

It is now some years ago that attention was drawn to the developing powers of quinol or hydroquinone, and the general result of experiments made at the time was to the effect that while under certain circumstances it might be desirable to use it, its then price made it prohibitive for general use, and it was laid aside principally for that reason. The position is now altered, and this chemical, that I paid for at the rate of 12*s.* per ounce, I find now in a dealer's list can be bought for 2*s.* per ounce, or one-sixth of the former price. It still, however, remains to be seen whether quinol, on its own merits, will supersede pyro. The result of my own experiments some years ago was to satisfy me that there had been no result produced by the quinol that I could not have obtained equally well with the pyro. An advantage is claimed for the quinol in the development of lantern slides, and probably there would be less stain with it than with pyro, but then it is not against pyro that it is pitted in the lantern slide development, but against ferrous oxalate. That it is a slow, steady worker is certain; in fact, sometimes so slow that, as an amateur friend describes it, 'You put the plate into the developer, go to dinner, and after dinner you can take it out and it's all right.' With an over-exposed plate no doubt quinol is a very safe developer for an inexperienced hand, and it admits of great latitude in its admixture with alkalies. Of its keeping qualities I can give this experience. Two phials

were filled with ten-per-cent. solutions, one of quinol, the other of pyro, this latter in accordance with Abney's ten-per-cent. formula. They stood side by side on the same shelf for two years, and at the end of that time the pyro solution was perfectly good, the hydroquinone was spoiled. On the whole, I think that it will require a 'better man' than quinol to displace our old friend pyro.

HOW NOT TO DO IT.

By William Adcock.

'My plates are all fogged!' is the cry of many of those amateurs who have taken lessons in photography and have been dismissed by the teacher as fit to go home and do it.

These recruits on being asked 'How about your light?' seem at first unconscious of having to provide anything very special, even for the 'extra rapid' of the present day, in their dark room. They innocently think the minimum of ruby, and the maximum of light through it, the best condition for *seeing* the way to a good negative. They find their plates spoiled and they flounder about unconscious of the cause. 'It must be the developer. It must be that confounded sulphite.' They try Beach, Brown, Jones, and Robinson, with the same or worse results; whereas if they made their developing light safe to a rapid plate laid two feet in front of it a half, or, better still, a whole minute, all would go well.

In a seaside town I cannot name, I was lately offered a developing room, where in front of a sink was an over-large single sheet of ruby and blazing sunlight streaming through it. White light pierced the chinks of the door, and that room had positively been prepared for its owner's assistant to give lessons in, the owner being a dealer in photographic materials. Dry plates may well be in demand. Who buys the old glass?

CONVENTIONS.

By Richard Keene.

Photography is notably a fast goer, and has made quicker progress than any other science or art with which we are acquainted. This rapid progress would seem to apply equally to Photographic Conventions, the first of which was held in Derby in 1886, the second in Glasgow, and the third and last in Birmingham. Those who had the pleasure of attending them all must have noticed the enormous strides between the first and last meetings. Not that I intend to decry the meeting at Derby, got up as it was in great haste and without due preparation—no, the Derby Convention was a great success, and, though but few, its members were of the right sort to set the ball rolling. The impetus then given carried it to Glasgow, where, with greatly increased numbers, we had a good time of it; then to Birmingham, our last and greatest meeting, and the Photographic Conventions of the United Kingdom seem now to be established on a broad and solid basis, and will be looked forward to year by year by every lover of the art-science. Apart from the number of interesting and valuable papers read at these meetings, and the exhibition of new apparatus, &c., which help to post one up in all matters photographic—coming into personal contact with members from all parts of the country, and the conse-

quent interchange of thought and experiences, is perhaps one of the greatest helps to the diffusion of knowledge. Here the professional and the amateur meet on common ground, and all sorts and conditions of men are assembled together (I wish more ladies joined us), and seem animated by the same good-fellowship, freely imparting and receiving such information as each may possess, and working together in the numerous excursions day by day. What a host of pleasant memories arise when thinking of those excursions; for though we could not always have good weather, we always had good company and great enjoyment.

Take the day at Dovedale, for instance, when it rained as it can rain sometimes in the Peak of Derbyshire; or the wind and smoke in Glasgow on our first day there; or the wet days we had at Birmingham! Even on these occasions we did some work—and had some fun, at all events. But when I think of such days as those spent at Matlock Bath and Chee Dale, or by the murmuring Markeaton Brook; those on the steamers of the Clyde and amongst the lovely lochs of Scotland, and the ride round Edinburgh—last, but not least, of our days in the land of cakes; steaming down the Severn from Worcester to Tewkesbury and Deerhurst; the day at Coleshill and Maxtoke, with their superb Saxon font, priory ruins, and ancient moated castle; or that at

'Beggarly Broom and drunken Bidford,'

Salford Priors and Welford, with their charming cottages and old lichgate —when I think of such sunny days I forget all the little inconveniences of bad weather and wet rides, and revel in recollections of lovely scenes by land and water, of old churches and historic buildings, jolly lunches, and quiet pipes or enjoyable chats.

A whole volume might be written on the sayings and doings at each Convention, and of the adventures and misadventures of its members in search of the picturesque, rivalling those of the immortal Dr. Syntax. The detective camera would furnish illustrations of some of the incidents, and the book would have a ready sale. It would also be interesting to dry plate makers and others to know how many plates were used (or wasted) during a Convention week; the grand total would be enormous. Six cameras were in use at Coleshill and Maxtoke, only eight of us taking that particular journey, and yet we bagged 134 views. This small fraction will afford some idea of the great number of exposures made altogether.

What the 1889 Convention in London will be remains to be seen. That it will far exceed in numbers its predecessors is beyond all doubt. It will require some amount of skill in arrangement and management, for we predict a great gathering—such a meeting of photographers as never was seen before or dreamt of. Let us conclude by wishing it every success.

A DARK-ROOM WINDOW.

By Edgar Scamell.

A very convenient screen can be arranged, so as to dispense with a blind or curtain to the dark-room window, by having a light wooden sash running on an iron rod of about half-inch diameter by means of two iron pulleys screwed at the top. If this sash be glazed with ruby

glass, or plain glass, and fabric pasted on the daylight side, and then the right-hand half have another thickness of fabric, whilst the window itself be glazed with an extra thickness on the left-hand half; then three, two, or one thicknesses can be had in the centre of the window at pleasure, thus:—

Window open.

Window.		Sash.	
Two thicknesses.	One thickness.	One thickness.	Two thicknesses.

Window half shut.

Window, two.	Window, one. Screen, one.	Screen, two.

Window shut.

Window, two. Screen, one.	Window, one. Screen, two.

Of course, the screen being of glass, it will not stain the same as a blind, and will move very easily on the iron rod hanging on the pulleys.

If a silver print requires tinting to reduce the hardness, tint it from the back by exposing the plain paper side to the light, when the high lights will tone without blocking up the shadows.

SMALL PLATES AND WINTER EVENINGS.

By Alexander Scott.

Personally, I have always had a leaning towards small plates for many reasons. If you are going on a tour which is not strictly photographic, it is very easy to carry a quarter-plate camera among your luggage, while you could not take a whole plate set without adding considerably to what you take with you. In other ways small plates are also useful; you may expose two or three plates on the same subject, thereby increasing your chance of getting a perfect negative, when if you were using a large plate you would not care to expose so many.

But to me the greatest advantage of small plates appears to be the making of transparencies by contact on any of the various makes of plates now in the market for that purpose. Let an amateur, when away for a holiday, take quarter-plates, then in the dull hours of winter make transparencies, and instead of showing his friends prints, or giving them the trouble of going through albums, let him invite them to see the result of his work on the lantern screen. In this way a pleasant evening may be spent. Small plates can also be enlarged upon bromide paper, thus giving another occupation for winter evenings. If any one thinks these hints worth taking he is welcome to them.

A BASEBOARD FOR STEREOSCOPIC WORK WITH A SINGLE CAMERA.

By Alfred Read.

I much regret, Mr. Editor, that I have nothing more worthy of your Almanac this year, and am afraid you will consider this little bit 'too very' small for insertion. It only relates to a little variation in the form of a base-

board for stereoscopic work with a single camera, on the pattern described at page 55 of the ALMANAC for 1887. Whether an improvement or not you must determine. The triangle top appears to be in the way of cutting a slot so as to enable the camera to slide right across, unless the board is made so wide as to be cumbersome, whilst to wholly remove the camera and screw it on the other side is troublesome and takes time, so I made a baseboard of baywood twelve inches long by three inches wide, and only sufficiently thick to be rigid. In the centre I fixed a bush taking a small camera screw, by which the board is fixed to the stand top. Then lengthwise in the centre of the board I cut two slots just wide enough to take the screw of the camera, and at the end of each slot furthest from the centre I made a hole large enough to let the head of the screw pass out. Thus:—

Having taken one view I have only to loose the camera screw a little, slide the camera to the hole where the head of the screw passes out, and the camera is quickly transferred to the other side of the board. The top of the board should be a rectangle, and ruled across with parallel lines half an inch apart, to serve as guides for the side of the camera.

AN IMPERVIOUS COATING FOR WOODEN DISHES.

By G. W. VALENTINE.

AN excellent coating for home-made wooden dishes for sensitising, developing, or fixing purposes is recommended to be made from equal parts of Swedish pitch and vulcanised rubber (or even old bicycle tyre, white or red, will do), with one-fourth part resin, boiled up together in an old saucepan. The mixture being very inflammable, it is as well that it should be made out of doors, with the lid of the saucepan handy in case it should catch fire. If not quite liquid enough add a little more pitch. When melted, stir and apply with a paint brush quickly, having previously well dried the dish before applying the solution, being particular to well work it into the joints.

HINTS TO THOSE WHO USE DETECTIVE OR HAND CAMERAS.

By A. R. DRESSER.

IN last year's ALMANAC I wrote about detective or hand cameras, and will this year continue the subject, and try and give a few hints to those beginners who want to go in for that sort of camera.

There are plenty of hand cameras of various sorts and forms now in the market, and one can pick and choose; but I have not yet found one that gives me as good results as the one I had made to my own pattern, and feel sure the longer I use it that it is the future style of camera for

artists, and those who do not care to go in for large cameras; and the more I travel the more I like it, and now seldom use any other. My experience teaches me that for this style of camera a wide-angle lens is the best; but whatever lens is used, it should not be over 4½-inch focus for a quarter-plate, as if of a longer focus, you cannot get objects within a short distance in focus without refocussing every time. But, with a good lens of 4-inch focus at $\frac{f}{11}$, everything, from twenty foot to far distance, should be in focus. There are any amount of good lenses, but the best I have got for this purpose are a 4¼-inch focus Beck lens and a Voigtlander euryscope 4⅕-inch focus. I use the Voigtlander lens, and find it covers perfectly at $\frac{f}{11}$ everything from twenty feet to far distance. I have come across a number of amateurs who use lenses of 6-inch and 7-inch focus; but all that I have come across find they do not work well, and are giving them up, and are going in for short-focus lenses. I have just returned from a long trip with over 200 detective quarter-plate negatives, and find that they have all turned out well, which speaks well for the lens. In all the lot I have not got one plate spoilt by either the camera, lens, or shutter; and they are all sorts of subjects, from $\frac{1}{100}$ of a second up to fifty seconds exposure. So to all who go in for small-sized cameras I say, Get one of the detective (so-called) form, and you will not regret it.

Next comes the plate to use. This year I have mostly used Ilford fast and Paget plates. I use every make of plate I can buy for trials, but find that for sure results the Paget come first and Ilford extra-fast next; but the fault with the Ilford is that it is so hard to get density unless you intensify, and then you can get any amount. But I should advise the use of Paget's fifty-times plates for all-round work, and if they are developed properly any amount of density can be got. The only thing is to take care they do not fog, as the *least* fog will cause the negative to be thin; also do not use too much ammonia at first, or else the negative will be a poor, thin, useless negative. I find that about three-quarters to one grain pyro gives full density; and when commencing development I use at first half to one drop ammonia, and add more as required. I find these plates develop by far the best with either pyro-ammonia or hydroquinone; and the pyro-potash developer does not give such good results—at least, when shutter work is done. For fully exposed negatives the pyro-potash will do as well as the other; but you must use it with care or the plates will frill directly.

I go in mostly for Eastman negative films, and find they are all I require. The extra fast films are the best for shutter work, but for time exposures I prefer their ordinary films. While away during September with my detective camera I had to use the ordinary films, as they had no extra fast on hand. I was much disappointed, but had to take what I could get, and was in a state to know how they would turn out, as I exposed six or seven rolls. I have developed only one, but all the exposures of that spool were at $\frac{1}{50}$ to $\frac{1}{100}$ of a second exposure, and they have all turned out fairly well; a little under, but will all print well except in platinotype; but print first-rate in bromide. I find that they take a long time to develop, but pay for waiting; as if not as good as plates, they are so much more useful when on a journey.

I find many grumble at having to strip, &c., and say the trouble is more than it is worth; but I do not agree with them, as when away from home for a trip I would not carry plates at all, except when I wish to take

picture and develop it where I was at the time. One great trouble is preparing your glass previous to placing the film upon it, and many will not go in for films for that reason, and so perhaps a hint may be of use to them. Take a piece of 5 × 4 glass (for quarter-plate films) and well wash it and put by to dry, then give it a good rub with 'French chalk,' and place your film on it (*do not* put the glass in water first), squeegee well, and put by on one side to dry. I find it best to leave it till *quite* dry; never mind if it is a day or two days after, it will strip just as well or, in fact, better. When you want to strip, place the glass with film on it, into a solution of hydrochloric acid and water (1 to 25 or 30), leave it in for a few minutes, and then stand to dry for a few minutes; and if, then, you put some hot water (as hot as you can bear your finger in), in about one or two minutes the paper will come off with ease, and the film will remain on the glass. I never use rubber solution or collodion, and seldom lose a negative. I stripped fourteen 8 × 10 film negatives to-day that way and did not lose one. I give this hint to those who wish to try it, as it saves both trouble and money.

For lantern work and enlarging there is no good in using skins and stripping, as if you place the glass towards the camera when copying you will get the print the right way. The only difference is that you copy with glass in front of the film, instead of at the back; and the results are the same if your glass is good and clean. I find many run down films; but I get as good results with them as with glass, except with the quickest exposures, and then I find glass the best.

I find when I either enlarge or make lantern slides it is best to copy through the camera and by daylight. Of course, when enlarging this way you require a camera the size of the enlargement required; but as I only enlarge up to 10 × 12, it is easy to procure one of that size, and any sort of camera will do that has a long extension, as to enlarge from quarter-plate up to 10 × 12 you require the camera to draw out to about thirty-two inches. When enlarging I use a Beck 7-inch wide-angle lens, and find it gives results as good as can be got. As a rule, I find 8½ × 6½ or 10 × 8 is quite large enough to enlarge quarter-plates up to, as they will bear to be enlarged up to 8½ × 6½ when they will not bear enlarging up to 12 × 10. I find I can take the pick of my quarter-plates, and get prints 8½ × 6½ from them nearly as good as direct prints of that size. For so doing I use either bromide paper or Alpha paper. I find I get the best results on bromide with Eastman A paper; but, as a rule, I prefer alpha, and use it nearly always for enlarging and printing, and can get results with it hard to tell from bromide or platinum. To get that colour I tone a new way, namely, Develop your print with iron (as per rules); then wash once or twice with acid bath (acetic acid, 3 drachms; water, 4 ounces). Then well *wash*, and pour on a solution of mercury (half saturated), and leave till the image goes away; then wash for a few minutes under the tap, and pour on a saturated solution of sulph*ite* of soda. The image will appear at once. Keep this solution on for a minute or so, and wash again for one minute; and then put in the hypo (quarter saturated solution), and leave for ten to fifteen minutes. The print will be a rich brown; but after it has received a good washing and is dry it will be black, and if properly exposed it is hard to tell it from a platinotype. For lantern slides (which is my hobby) I use Fry's lantern plates, and develop with hydroquinone; and find I get by far

the best results when using the hydroquinone developer. I buy my hydroquinone developer, as I find I get better results with a developer that I buy than when I make my own. I use both Mayfield's and Hetherton Lewis's hydroquinone, and find they are about the same; but as a rule for slides I use Mayfield's, as being well used to it I get the best results. I find far better results are got by copying through the camera than by contact, and so do all mine that way. After your slide is developed and fixed, clear it in a clearing bath; and for so doing I find Edwards's clearing solution the best (formula in the *Year-books*), and by so doing you procure clear glass.

You can procure various tones in your slides by intensifying after well washing; but if you do so you must not develop too much, but get a rather thin slide. You then whiten with mercury, and after well washing treat it with a bath of the following:—Ammonia (·880), 10 to 15 drops to 1 ounce water, or saturated solution of sulphite, or saturated solution of potash, or saturated solution of washing soda, or redevelop again with hydroquinone, which will give a deep black tone—the sodas give a red tone. Having given a number of intensifiers, try them all, and take which you like best.

For contact printing by daylight I think that the new printing-out platinotype paper is the coming paper, as you can get good results with either a thin or dense negative; and this is the only great point it has ahead of the old platinotype paper, except being able to see your print appearing, as when using silver paper; and why some good English firm does not put it on the market I cannot understand. What we get now is so uncertain, some very good and some very bad; but when we get a really good sample on the market I feel sure silver paper may take a back seat except for portraits.

THE PHOTOGRAPHIC A B C.

(*Written Specially for Amateurs.*)

By W. Ingles Rogers.

A stands for Amateur, for whom these lines are penned,
And also for Albumen, the Silver-Printer's friend;
For Acetate of Soda, which we use our prints to tone,
Ammonia (an Alkali) the use of which is known,
And Alcohol which *now* by *us* is very seldom used,
Although by *others* we may see it very much abused!
It stands for Argentometer, for Album, and Alloy;
For Alum and for Almanac, which latter we enjoy;
It stands for *Alpha*-paper, too—you *bet* (that's if you may),
That *this* shall have a mention in this *Alpha-bet*-ic lay.

B stands for Bromide, which I think, beyond a doubt,
Is a salt that we photographers could badly do without:
We use it in emulsions, and developers as well—
In fact, its various uses 'twould be tedious to tell.
For Bottles and for Backgrounds, of which we use a few;
And Burnishers, which make our work presentable to view.
It also stands for Bubbles which Developers avoid,
And Blisters, those *bête noirs* by which we sometimes are annoyed;

It also stands for Brains, of which the more we have the better,
And BRITISH JOURNAL, which, I think, is precious to a letter.

C stands for Camera, the mainspring of our art,
For Chemicals, Collodion, for Cabinet, and Carte;
For Cyanide—beware your life! this poison will destroy it!
For Carefulness, which we must use whenever we employ it.
It also stands for Changing-box, an article we prize,
By which our 'rapid' plates are changed beneath the open skies.
It stands for Citric Acid, which we use our plates to clear,
Chloride of Gold, a precious salt (which makes it rather dear!);
For Carbon-work and Collotype, both pleasing occupations,
And Cutting-shapes, which we employ in 'trimming' operations.
In fact, ye bold photographers, I don't know where we'd be,
If we hadn't all the articles whose names begin with C.

D stands for Diaphragm, which gives us 'equal field,'
And Diamond, beneath whose touch the toughest glass will yield;
It also stands for Dirt, which we should scrupulously shun,
And for Dark-room, in which all our Developing is done.
It stands, too, for Drop-shutter, which the most of us possess,
And Discs which in the printing-frame contribute to success.

E stands for Ebonite, from which our trays are made,
And also for Emulsion, which upon our plates is spread;
It stands, too, for Enamel, which to prints confers a charm,
As well as for Enlargements, which pleasing pictures form.

F stands for Focussing, a most important thing;
For Films and Ferrous Oxalate, which we together bring;
For Finder, which at times we Find a useful instrument,
And Frilling—ah! you all will know what by *this* word is meant!
For Formulæ, which we should Find it hard to do without,
And Flash-light, which of late there's been a great Furore about;
It also stands for Failures, which are known to most beginners,
Though perseverance, in the end, will make them come off 'winners.'

G stands for Gelatine, of General utility,
And Glass, to us photographers—an indispensability!

H stands for Hypo, our enemy and friend,
Which makes us o'er our washing such a lengthy time to spend;
For Hydrochloric Acid, for Head-rest, and Halation,
And Hydroquinone, the latest new developing 'quotation.'

I's for Instantaneous, by some folks much affected,
Though 'slow and sure' 's the motto that *I* think should be selected;
It stands, too, for Interiors, a pretty class of view,
And for Intensify, which we are oft obliged to do.

J stands for Judgment, and I think you all will say,
It is often very useful our too hasty hands to stay.

K stands for Knowledge, and if you would attain it,
Be guided by experience, and you'll be sure to gain it.

L stands for Light, which is the Great Primeval Cause,
And Lens, that grand invention formed to suit Light's various Laws

For Lantern, too, by which we may 'bromide enlargements' make,
And Landscapes, which most amateurs are quite content to take.

M's for Magnesium-wire, that pyrotechnic wonder,
By which we make a lightning-flash without the usual thunder.
It also stands for Miniature, we often see in lockets,
And Money, which it's difficult to keep within our pockets.
It stands, too, for Medallion, for Measures, Mask, and Mount,
And Minutes, which on cloudy days we often have to count.

N stands for Negative, a thing we often boast of,
And Nitric Acid, which emulsion makers know the most of.

O stands for Opal, which the most of us admire,
And Opaline (for specimens of Percy Lund inquire).
It stands for Over-exposure, in which some will persist,
Oval, and Orthochromatic, which finishes up the list.

P's for Photography, Photographers, and Pyro ;
Platinotype, a novelty, sought after by the tyro ;
Paper, Plates, and Plate-racks, Prints, and Printing Presses ;
Pinholes, Portraits, Pedestals, and Positive Processes ;
Pencils which retouchers use, their Pictures to improve on,
And Policemen, who, when 'taking,' oft will order you to 'move on.'

Q stands for Quarter-plate, the size the tyro chooses,
And Quarter-Quire, the Quantity of paper that he uses.

R stands for Ruby-light, a non-actinic medium,
And also for Retouching, which is thought by some a tedium.

S stands for Studio, where portraits best are taken,
And Soda, which we use the latent image to awaken.
It stands for Silver-nitrate, which we use on plates and paper ;
Silesia, that useful stuff we purchase of the draper,
For Spots and Stains, those 'grievous ills the Silver-print is heir to;'
And Swear, which we should often do but that we wouldn't dare to.
It also stands for Shutters, which (like Berry) gives a 'drop,'
For Stand, for Slide, for Shoulder-Strap, for Spirits, Starch, and Stop.

T stands for Tripod, a necessitous adjunct,
Deprived of which the Tourist race would soon become defunct.
It also stands for Toning-bath, for Tables, and for Trays,
Which are useful in developing and many other ways.

U's for Uranium, a salt we rarely use,
Though I've often seen it mentioned in 'Foreign Notes and News.'

V stands for Varnish, which to films affords protection,
As well as for Vignette, which in a portrait 'looks perfection.'

W's for Water, which to us is indispensable,
(It takes but little argument to make this comprehensible).
It also stands for Wisdom, which no real artist lacks,
For Winchesters and Washing-troughs, Windows, Weights, and Wax.

X is for 'Xposure, which requires so much discretion,
'Xpenses, and 'Xperience, 'Xhibit, and 'Xpression.

Y stands for Yacht, in which we take a sea-excursion,
And Yellow-fog, to which we all have very great aversion.

Z stands for Zinc that's used for printing in relief,
And Zeal, which of our attributes should be one of the chief.

My Alphabet is ended; I have given you a sample
Of what photographers require. You'll find the list is ample!
You may be a learnèd scholar, sir, in Classics and Geography,
But if you're in for Sciences—just patronise Photography.

ISOCHROMATIC PHOTOGRAPHY IN PRACTICE.

By John A. Hodges.

I propose to deal with my subject entirely from a practical point of view, as the heading of it will sufficiently indicate. In the first place, let me say that the indifferent results which rewarded my efforts to photograph some flower studies with ordinary gelatino-bromide dry plates led me to give the isochromatic process a trial. I will not enumerate all my failures, though any one who has tried to photograph yellows and reds will appreciate my difficulties; but an early experiment with the prepared plates may be instructive. I arranged a test subject, consisting of a large sunflower in a blue vase standing upon a pile of red and blue books—a sufficiently severe test—and upon this I made two exposures, one with an isochromatic plate, and the other with a rapid plate of a well-known brand. Upon development, both negatives proved to be slightly under exposed, though in about an equal degree; therefore a comparison could be fairly made. The difference in results was most striking. In the isochromatic plate the sunflower was perfectly rendered, being full of gradation and detail, and afforded a good print, while in the ordinary plate it was scarcely visible, and appeared quite black when printed. The relative values of the blues and reds were also much more truly rendered. This experiment was made just before starting for my annual holiday, and the result I considered fully justified me in employing these plates for landscape work, and it is of the experience gained in the exposure and subsequent development of something like a gross of these plates that I wish to write.

I should say that the plates which I have been using are those prepared by B. J. Edwards & Co., of London, who, I believe, have the exclusive right of manufacture in this country.

A properly prepared isochromatic plate being sensitive to the yellow and well into the red rays of the spectrum, it follows that the ordinary illumination of the dark room will not be suitable for the successful manipulation of these plates. In my own practice I use a paraffin lamp with a deep ruby chimney, further screened with one thickness of the deepest ruby paper obtainable, and as a further precaution I keep my developing dish covered until the details of the negative are well out. If this point is not attended to, good results cannot be obtained on these plates.

The plates I used during my holiday were exposed under widely varying conditions of light, subject, and exposure, and although in some instances I had made considerable errors in judgment in estimating the

exposure, yet on the whole, judging from their behaviour during development, I believe isochromatised plates to allow of more latitude in this respect than is permissible with ordinary plates. As regards sensitiveness in the camera on bright days, I found them not to exceed in rapidity those of several well-known makers, but in dull, and more particularly in foggy weather they are certainly more sensitive, and in this respect I found a great gain in their use, as I was enabled to secure good negatives under conditions which with ordinary plates would only have resulted in failure. I also obtained some very good negatives, beautifully soft and full of gradation, from plates which were exposed quite late in the evening—at dusk, in fact—giving, of course, very full exposures.

It is a well-known fact that plates rendered isochromatic by any of the bathing or dipping processes quickly deteriorate by keeping. I was assured by the manufacturers that I had nothing to fear in this respect, as the plates would keep indefinitely, but, I am sorry to say, my subsequent experience does not justify me in maintaining that assertion. I found upon developing some of the plates that no amount of forcing would cause detail to appear in some cases, even after they had been subjected to the action of the developer for a prolonged period. These plates after fixation exhibited, here and there, patches of clear glass, evidently due to the gradual decomposition of the emulsion causing insensitiveness. My observations have forced me to the conclusion that the isochromatic plates as prepared commercially at the present time will keep perfectly satisfactorily for a reasonable, but not for an indefinite time. The occasional development of a test plate will prevent the possibility of failure arising from this cause.

When I commenced to develop, I began by using the developer with which I am accustomed to work. I have long discarded the use of sulphite of soda and prefer to use a plain solution of pyro to which a small quantity of citric acid has been added. I therefore used this with ammonia and bromide in ten per cent. solutions. But the results I got with this developer not being entirely to my satisfaction, I cast about for something better. I therefore substituted potash for the ammonia, but I quickly found that the use of this with plain pyro stained the film to such a degree that it became imperative to add a proportion of sulphite in order to avoid the discolouration. This gave me some good negatives full of gradation and detail, and very soft; but wanting a more vigorous class of negatives, for the purpose of printing in platinum, I tried yet another modification of my developer. In ten ounces of water I dissolved sulphite of soda to saturation, and to this I intended to add half a drachm of sulphuric acid, but by a mistake, which I did not discover until afterwards, I added one and a half drachms of the acid, and, lastly, one ounce of dry pyro. I used this in conjunction with ten per cent. solutions of ammonia and bromide of potassium. For a normal exposure, say, on a landscape, I compounded a developer as follows:—

Pyro solution	30 minims.
Bromide	10 ,,
Ammonia to commence development	5 ,,
Water to make	2 ounces.

Of course the above proportions are merely given by way of illustration, requiring to be varied to meet the necessities of each particular exposure.

While upon the subject of development, I should mention that a characteristic of these plates is the comparative ease with which density is obtained; on ordinary subjects one grain or a grain and a half of pyro to one ounce of water will be found to give ample density. With the developer compounded as above, notwithstanding the enormous proportion of acid present in the pyro solution, I have succeeded in getting uniformly good results, the negatives being full of gradation and of a rich brown colour, not at all to be confounded with that produced by the use of plain pyro, but more resembling that which characterised the negatives produced by some of the dry collodion processes.

To sum up the case for isochromatic plates, I should contend that the few disadvantages which occur in practice are more than counterbalanced by the undoubted advantages which accrue from their use. That the negatives obtained by the process exhibit far more gradation and half tone than those produced on ordinary plates is undoubted, and this is particularly the case in the rendering of foliage and cloud effects, for the reproduction of which the plates are eminently suitable. For my own part I consider the introduction of these plates confers a great boon on the photographic fraternity, and that it is to the development in the future of this phase of the art-science that we must look to the further advance of photography as an art.

In conclusion, Mr. Editor, I wish you, and all readers of The British Journal Photographic Almanac, a happy new year, and every success with isochromatic plates.

HINTS ON BLOCKING OUT SKIES.

By E. Traill Hiscock.

Most photographers, whether professional or amateur, have at times to block out skies in negatives—in most cases chiefly for the addition of clouds by double printing.

The ordinary method of doing this is to use a black varnish applied with a brush, or to cut out a paper shape; both of these ways being somewhat tedious and the results not always satisfactory. The quickest way, and certainly the most satisfactory, is to obtain a paraffin lamp and turn the lighted wick up till it smokes, then hold the negative over glass side (not the film) till the sky is blackened with the smoke. It is as well to let the smoke go over part of the subject as well as the sky. The negative is then held up to the light, and the parts not required to be opaque can be cleaned off with a duster.

INTENSIFICATION DIFFICULTIES.

By John A. W. Dollar, M.R.C.V.S., Lond.

During an excursion in Scotland, in July last, I visited many points of interest and exposed a large number of plates. The camera I used was a 'detective' on Watson's model, and the plates were of an extremely sensitive character, being specially prepared for this work. On returning to town my spare evenings were utilised in developing, and I was pleased

to find that I had been fairly successful. One thing, however, troubled me. Despite heavy doses of bromide and a large proportion of pyro, I found it quite impossible to secure printing density, the plates, like so many of the very rapid class, being far too thinly coated. I therefore stopped development before veiling of the shadows took place, having determined to try some form of intensification.

Looking back through my files of THE BRITISH JOURNAL OF PHOTOGRAPHY, I at length settled on the bichloride of mercury treatment, followed by solution of sulphite of soda.

These solutions I prepared by placing excess of the respective finely pulverised salts in twenty-ounce stoppered bottles containing sixteen ounces of distilled water. The bottles were shaken several times a-day, and in a week the solutions were ready for use. In the meantime the negatives (quarter-plate size) had been thoroughly washed and dried, and as they were all of about the same want of density I determined to treat several together. Having placed five in an 11×9 dish, I at once poured over them the solution of bichloride of mercury. In about three or four minutes the films were almost entirely bleached, and it was at this stage that the first symptoms of a peculiar phenomenon manifested themselves.

Over the shadows, which of course were clear glass, the gelatine began to show a fine reticulation. At first this was so slight as to be scarcely visible, but it could easily be discovered by rubbing the film with the ball of the finger. From the shadows this condition spread to the thinner portions of the picture, but appeared incapable of affecting the denser parts or the high lights. The shadows, in the later stages, were appalling to behold. There the reticulation had become very pronounced, and over parts of the negatives the raised pattern appeared as though completely separated from the glass by the interposition of fluid. Where the clear parts of the negative came in contact with the sky this appearance was exaggerated, but the sky itself remained unchanged.

In a negative of the buildings at the Glasgow Exhibition this phenomenon showed itself in a singular manner. All round the margins of the buildings extremely small pinholes made their appearance, so that the latter (in the negative) looked as though hung with thousands of fairy lamps. On washing the plates and treating them with sulphite of soda, the reticulation came out as a black pattern overlying the image and quite spoiling it.

I at once stopped further operations, and, being at a loss to account for the nature and cause of the mischief, had recourse to our worthy Editor. And here I must say a word of thanks for the extremely kind reception which that gentleman accorded me. Although I visited him on Wednesday, when there was a great pressure of business, he at once laid everything else on one side and plunged into this matter with deep interest. After fully going into the subject we came to the conclusion that the error probably lay in not wetting the plates before beginning operations, and numerous subsequent experiments have confirmed this view. Mr. Taylor also advised me to experiment in the direction of saving the damaged plates, which I have since done with a considerable degree of success.

I consider the best process to be that used for local reduction, viz., friction with a rag moistened with alcohol, although 'ozone bleach' is

also very useful, and I have in this way saved three out of five negatives, making fair prints from them. The defect, being more superficial than the structure of the image itself, admits of being in a great measure removed without damage to the negative.

In conclusion, I was greatly struck with the character of the reticulation, which I thought might be utilised for producing a grain for photomechanical printing.

I give the suggestion for what it is worth, but, should any one care to experiment in this connexion, I should advise the use of a thin coating of *soft* gelatine, and I may remark that the plates showing this defect in the greatest degree were not alumed either during or after development.

NOTE ON THE ESTIMATION OF 'HYPO' AND SULPHITES.

By John Henry Smith, Ph.D., F.I.C.

There is a method for the estimation of the above, proposed by Professor Lunge and myself,* which is probably little known to photographers, but may be worth while describing here. The method is founded upon the oxidising action of potassium permanganate upon thiosulphates and sulphites, converting both to the form of sulphate. The ordinary method of titration in acid solution is, however, inadmissible in the case of these salts, since sulphurous anhydride (SO_2) would be liberated; and in the case of 'hypo,' sulphur would be precipitated as well. The titration must, therefore, be conducted in a neutral or, preferably, slightly alkaline solution, and a *large excess* of standard permanganate solution added, as *direct* titration cannot be employed on account of the precipitation of hydrated peroxide of manganese. As potassium permanganate ($K_2Mn_2O_8$) liberates five atoms of oxygen in being reduced to the form of manganous oxide (MnO), the final form in direct titration, and only three atoms in being reduced to the form of peroxide (MnO_2), we require to add five-thirds the quantity of permanganate which would be used in a corresponding direct titration. Practically an additional excess of about twenty per cent. should be added.

105⅓ parts by weight of pure potassium permanganate is theoretically required for the complete oxidation in *alkaline solution* of 62 parts of pure crystallised 'hypo' ($Na_2S_2O_3$, 5 Aq.), or 252 parts of pure crystallised sodium sulphite (Na_2SO_3, 7 Aq.). From these figures it can be easily calculated how much permanganate solution should be added for a given quantity of the salt to be tested. It is of little consequence what strength of permanganate solution is employed, so long as it is accurately standardised by means of iron wire, or pure oxalic acid, when first made. A convenient strength, however, is a solution containing about 10 grammes per litre of 'recrystallised' potassium permanganate; and a quantity of salt equivalent to about 50 c.c. of this solution (the necessary excess included) might be conveniently employed.

The oxidation is completed immediately, even in the cold, and then the precipitated hydroxide of manganese is dissolved (or, more correctly, reduced to a soluble form) with excess of standard acid ferrous sulphate solution, and finally titrated back with the standard permanganate in the

* *Journal Society Chemical Industry*, 1883, Vol. II., p. 463.

ordinary way. The actual amount of permanganate required for the oxidation of the salt (with reduction of the permanganate to the form of MnO) is obtained from the difference of the total quantity added, and the quantity required by the ferrous sulphate.

From what has been stated it will be understood that $105\frac{1}{3} \times \frac{3}{5} = 63\frac{1}{5}$ parts of permanganate *finally* absorbed correspond to 62 parts of pure crystallised 'hypo,' or 252 parts of pure crystallised sodium sulphite.

This method, in conjunction with the ordinary iodine method, was employed* for the purpose of estimating the amount of sulphite and thiosulphate in mixtures of these salts; which method proved to be very reliable and rapid, but would hardly be of sufficient general interest and importance to photographers to detail here.

NOTES ON ENLARGEMENTS.

By Dr. H. Valentine Knaggs.

'—— Until at last it came to be
For length and breadth, the bigness which you see.'—John Bunyan.

The working of positive enlargements of large dimensions is, to my mind, the acme of photographic bliss, provided of course that good results are secured. Our interest in the necessary manipulations is greater on account of the issues involved. The finished prints are in every way more presentable to ourselves or friends than is the case with small photographs taken direct from the negative, and ranging in size from quarter to whole plate. Moreover, possessed as we now are of such perfect bromide papers, the preparation of enlargements from small negatives is an extremely easy procedure.

Before discussing any details of the process as I have worked it for the last year it may be well to damp the ardour of many of those too-impetuous amateurs new to this work, by relating a few of the drawbacks thereto. In the first place, the expense is apt to prove a most serious item. For example, the cost of the paper alone, in sizes 25 × 21 inches and above, ranges from 1*l.* upwards a dozen sheets. If many prints get damaged from faulty or slovenly working, or if the finished pictures are given away with too lavish a hand, the drag on our slender purses is great. Secondly, the process is somewhat demoralising, because, having once thoroughly mastered the art of obtaining good enlargements of, say, over two feet in length, the photographer must of a necessity be loth to return to smaller sizes and contact printing. Again, it will be found that friends, especially if young, and casting their 'eagle eye' around for the wherewith to furnish and decorate their homes, are prone to pester the operator for copies. Many consider a good photographic enlargement to be the next best thing to an oil or water-colour painting. Indeed, what can be more acceptable to the generality of the '*genus homo*' than such a photograph on rough paper of an interesting and artistic subject, resembling, as it often does, a fine and delicately traced mezzotint.

Prior to entering thoroughly upon the actual manipulations of the enlarging process, the amateur should of course perfect himself, as far as possible, in the various 'ins and outs' of the art. He must, I take it, be

* *Loc. cit.*

proficient in producing a good negative and a satisfactory contact print before he can hope to become expert at enlarging. I do not propose here to enter into details of the apparatus used in taking enlargements; the subject was fully discussed in last year's ALMANAC. I desire to confine my remarks chiefly to development. I may mention, however, that the method I have usually adopted consists in blocking out the light from the window of a large and airy room. In this window the camera, with a suitable reflector and the negative in the place of the ground glass of the focussing screen, is adjusted. The exposures are made by daylight. The image is reflected upon a large drawing board, placed vertically, and in a plane parallel to the negative itself. To this board, after the exposure has been found by several trial slips of the paper, the sensitised sheet is to be accurately pinned in proper position. I find the 25 × 21 inches a highly effective and convenient size to work. A crisp quarter-plate negative is easily enlarged to the above size, and practically loses nothing in the matter of detail, provided the exposure has been correctly timed and the focussing sharp.

Assuming that our picture has been duly, and, let us hope, correctly exposed, we must consider the means necessary for developing and finishing the same. We shall require:—

1. *Two flat-bottomed trays* sufficiently large to hold the paper. Those made of *papier maché*, as being the most durable, are to be preferred. For a tray to hold paper 25 × 21 inches the cost would be about 12*s*. *The one tray is to be used exclusively for developing and clearing, the other solely for fixing and washing the print.*

2. A proper dark room.

3. An eight-ounce measure for mixing the developer.

4. Four large bottles, two being for the developing solutions, the third for the acetic acid clearing solution, and the fourth for the fixing bath.

To proceed with the development. I find it more convenient, and decidedly healthier, to use the same room in which the enlargement has been exposed. This room, when the cap is placed on the lens, should be perfectly light-tight, especially from direct rays. For lighting purposes I use a lamp extemporised out of a large biscuit tin. A few holes are pierced in the top and bottom. A side that has been cut out is pasted over with one thickness of canary medium texture. A candle is burnt in the centre of the tin. This allows plenty of light of the right sort, and is quite safe for the majority of bromide papers; Anthony's paper, however, being extremely sensitive, had better be worked with two thicknesses, or with a single layer of ruby fabric.

The developing solutions I prepare as follows:—Procure two large bottles, holding, say, about two pints. Fill the one about a quarter full of crystals of sulphate of iron (pure), and the other with the same amount of neutral oxalate of potash (pure), then pour hot water on each of them in turn.

It is unnecessary to measure out these ingredients, a saturated solution being merely required, but some crystals should appear at the bottom on cooling, thereby showing that saturation has taken place. To the iron solution add ten drops of strong sulphuric acid to each pint of the liquid, and to that containing the oxalate of potash add just sufficient of the same corrosive to make it decidedly acid in reaction.

To make the developer for use take five ounces of the oxalate of potash

solution, add to it one ounce of the sulphate of iron solution, and fill up with water to make twelve ounces. This quantity should be quite sufficient to develop properly a 25 × 21 picture. The water acts as an efficient restrainer, and obviates the necessity of using bromide. Still, it is better, perhaps, for the beginner to use it in the proportion of a drop of sixty grains to the ounce solution of bromide of potassium to each ounce of undiluted developer. The use of a few drops of this restrainer is also advisable where there is any doubt as to the correctness of the exposure, where the print has been over exposed, or where the negative is decidedly weak. Under exposure can then be remedied by pouring off the old developer and substituting a stronger one. I believe *the addition of water to be very essential to the successful working of these papers*, for it causes the liquid to flow evenly and uniformly over the paper, whereas, with a strong, undiluted formula, considerable difficulty is experienced in this respect, and undeveloped blotches and spots are very apt to make their appearance in the finished prints.

Having then prepared our developer the oxalate tray is to be flooded with water and the hypo solution poured into its own proper dish. Immerse the paper, face upwards, into the water in the developing tray. Do this with a kind of scooping movement, so that the back and front of the sheet are equally and, at the same time, uniformly wetted throughout. Allow the paper to soak thus for about two minutes, then pour off the water and flow on the developer. Continually rock the dish, with an undulatory movement, from corner to corner, rather than from side to side, until the image has acquired proper density. In a correctly-exposed print the image should begin to appear in about ten seconds, and proceed slowly to full density. When finished, pour off the developer and apply the clearing solution (two drachms of strong acetic acid to the pint is a good formula, and not too strong). Allow this fluid to go all over the surface, and, above all, do not omit to lift up the paper. For this purpose use the fingers of both hands, taking a fi m hold, for fear either of slipping, or tearing, or removing the corners. The oxalate of iron beneath the print is thus washed away, and subsequent straining is effectually avoided. This clearing bath should be changed two or three times. Lastly, after a couple of rinses in water, immerse the paper in the hypo tray. In a quarter of an hour or more it can be taken out, washed in running water for about an hour, and then dried. In preparing the fixing bath it is very desirable to use the purest chemicals, for the quality of various samples of hyposulphite of soda is found to vary greatly. Of course, if several prints are to be developed one after another, they can all be fixed in the same tray, but it is not a safe procedure to use the same hypo for more than one batch.

The best way to dry these large prints is to attach them by their backs to the surface of a large sheet of glass, such as can be found in many of the windows and doors of most modern houses. When the edges begin to curl it is time to remove them, allowing the drying process to complete itself on any flat horizontal surface, such as a table. The prints are trimmed in the usual manner, and are best mounted with starch on ordinary ticket-boards, when they are ready for framing.

I trust these few hints may prove useful to beginners. The entire process of making and developing enlargements is extremely simple. Good results are soon obtained after a little practice. Much of course

depends on the quality of the negative, those of moderate density, with plenty of detail and half tone, being best. Every year we hear of an increasing number of amateurs engaging in this absorbing branch of the art. Let our watchword be, then, small glass negatives, and taken therefrom, big enlargements.

SUBSTITUTES FOR CONDENSERS.

By Major Barrington-Baker.

Last year I described a method of enlarging without a condenser; for those who did not care to go to the expense of the latter article, and who had plenty of time upon their hands in the evening. I have not done much since then as it is a winter amusement, and winter has not, at the time of writing this, as yet set in; but I have a few more remarks to make on the subject.

A simple and inexpensive condenser may be made in this manner. (N.B.—This is not my notion; but has been tried, for another purpose, by a friend of mine.) Procure a concave glass of about thirteen inches diameter; such as is used for dial clocks; and have a sheet of glass cut to fit it; join these together with optician's cement and a few brass clips; leave a small hole at the top for filling, and at which form a small funnel of the cement. Fill carefully with pure glycerine, and you have a large plano-convex lens of about thirty inches focus. Two such would make a fair condenser at a cost of less than 5*s*.

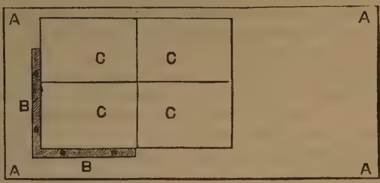
My lamp, a Belge, of forty-two candle power, had a nasty trick of smoking. I would gradually turn up the flame to the full, and leave it burning beautifully; but returning some minutes later find it emitting volumes of smoke, which formed a greasy deposit on everything in the room, and was most difficult to get rid of. A door being left open in some distant part of the house seemed to affect it. I am now thinking of trying a powerful kind of Duplex with a very large white flame; said to be sixty candle power; but the flame being so white the photographic gain will probaby be much more. It has also been suggested to me in discussion that an Argand flame, of, say, one inch diameter and of about five or six inches high, placed in the focus of a sheet of tin, bent as a parabola so as to throw an even illumination on a sheet of flashed opal, would be worth a trial. As the direct rays as well as the reflected would fall on the opal glass, the sheet of tin should not form a true parabola; but trials made with different curvatures until the best was found.

ON CENTREING PRINTS FOR MOUNTING.

By George Bankart.

One of the minor troubles of mounting photographs consists in the placing of the prints accurately in the centres of the mounts *at the first operation*, so that subsequent lifting and replacing may not be necessary, and time is often wasted in first marking the positions of the *dry* prints on the mounts with a pencil, so as to centre them when laid down, which is afterwards found to be inaccurate owing to unequal expansion of the prints when damped in pasting them.

The following plan will be found to work rapidly and accurately, and enable any one to get through three times as many prints in any given time:—



Have your mounting board, or work table, A A A A, arranged with two strips of wood screwed upon it in form of a 'square,' so that any card mount placed up to them shall fit squarely into the recess, as shown at B B.

Take one of the *same set* of mounts you are about to use, and with a pencil rule lines across the back of it, exactly at right angles, and dividing it accurately into four parts, C C C C, place this card in the angle formed by the strips of wood, and fasten the card down to the board by drawing pins. Now take your prints (already carefully trimmed with the cutting knife) and on the *back* of each place a small pencil mark *exactly in the centre of each edge, i.e.*, both sides and ends.

Apply the adhesive cement, of any kind preferred, to the back of the print, and as soon as it is sufficiently limp to lie flat, place the print *face downwards* on the marked card, with the *four pencil marks coinciding with the lines upon it.* If carefully done the print will be accurately centred upon this card.

Take a clean dry mount, hold it *face downwards*, and place the corner within the angle of the strips, B B, bending it slightly upwards so that it shall not touch the print until you are certain that its edges coincide with those of the marked card underneath, then lower it gently upon the pasted print, and press it into contact. Now reverse the mount and print, and complete the contact of them with a clean cloth, and finally give them a good rubbing pressure under a clean card, when the print will be found accurately centred and smoothly mounted on its proper support.

The advantages are:—(1), Speed in working, as no previous marks are required on the mounts. (2), Accuracy, as no matter what may be the size, or comparative proportions of the print, it must be properly centred if the lines on the card and the point marks on the prints coincide. (3), Ease of attachment, as the print can be laid down with perfect smoothness on *its face* on the dry card, whereas it is often difficult at the first attempt to so treat one that is covered with any adhesive compound. (4), The clean dry mount picks up the print with great smoothness and certainty, and renders any further pressure treatment of its surface an easy matter.

I hope this system may help my amateur brethren through the rather messy but necessary process of mounting their finished prints with ease and celerity.

SUBSTITUTE FOR OPAL PLATES.

By H. J. Rabbeth.

Finding that, either from my inexperience and faulty manipulation, or from some defect in the plates themselves, most of my attempts on opal glass were anything but successful, I looked about for some efficient substitute, as 'fooling around' with opal plates seemed to be rather too expensive an amusement when my successes were to my failures as about one to four. I found what I wanted in Eastman's transferotype paper, which is both inexpensive and easy to use, and if the very full directions given with each packet are followed no failures need be feared.

I find that the correct exposure at two feet from full light of an ordinary gas burner varies from half a minute under a thin, to one and a half minutes under a dense negative. Of course I first cleaned off my spoilt opal glasses and transferred the pictures to them. But I find that very good results may be obtained in either of the following ways:—

Take a negative which is not quite what you could wish it to be (if you have such a thing), and having washed it quite away (after taking one last fond, lingering look at it), proceed to fix your transferotype picture to the glass, then give the back of the plate two or three coats of white lead mixed with turpentine, and finish with a coating of varnish. This plan may also be tried with ground glass. Or transfer a picture to plain glass, as at first, and paint as before, but on the *picture* instead of on the back of the plate. I think a better result still might be obtained (but this I have not yet tried) by painting on glass as before, and finishing with one of the white enamels advertised to resist boiling water, then rubbing down to a matt surface with fine pumice dust, and after giving plenty of time to dry hard, transferring the print. I mean also to try Balmaine's luminous paint instead of the white, as I should think the effect would be curious.

The use of transferotype paper is not confined to glass plates alone, as *plaques*, vases, and, indeed, anything which will withstand the application of the hot water used in the process may be decorated by its aid, and can be rendered washable by being coated with colourless varnish.

Excellent lantern slides may also be made with transferotype.

PRINTING AND TONING.

By J. W. Lapham.

Many amateurs seem to find serious difficulties in printing and toning, so perhaps some hints on the subject may be of use to a few of the readers of the Almanac.

Most of the failures to obtain good prints are ascribed to the toning bath, which seems to be a kind of scape-goat, having to bear the blame for everything that goes wrong, and that the failures are more often due to the character of the negatives, is a fact which is generally overlooked. A poor, weak negative will not give brilliant prints, capable of being toned to a purple, or dark-brown shade, and the attempt to obtain those colours only results in the prints becoming mealy and grey, though they

might have been very good if the toning had not been carried beyond a warm brown.

Printing, as a rule, should always be done in the shade, unless with very dense negatives, or those which have been much intensified, as quick printing reduces contrast, therefore weak negatives with little contrast should be printed as slowly as possible, and it is often of great advantage to cover the frames with white tissue paper. Supposing ready sensitised paper to be used, it is advisable on receiving a supply to at once remove it from the roller and cut it into the sizes required, as it can then be kept flat in a tin box.

Damp being fatal to sensitised paper it is always made as dry as possible, in which condition it is impossible to obtain satisfactory prints on it, as they generally tone mealy, but the necessary amount of moisture can usually be secured by breathing on the back of the paper immediately before putting it into the printing frame. Print somewhat deeper than required to allow for subsequent reduction in toning and fixing. It is best to trim the prints before toning, as it saves gold and also space in the toning pan. A piece of fine-grained, hard wood is excellent for cutting the prints on, using a shoemaker's knife with the point rounded; the cut being just as clean as if done on glass, and the knife remains sharp much longer. The latter can be kept sharp by rubbing on a piece of thick, hard leather coated with emery powder and tallow.

The washing of the prints previous to toning need not, as a general rule, occupy more than four or five minutes, using three changes of water, which in cold weather should have the chill taken off; but some brands of paper being very acid, will require more washing than would be needed merely to remove the free silver. As soon as the washing is completed, transfer the prints to the toning bath, taking up each separately with one hand, and keeping them moving in the toning bath, faces down, with the other until they are all in. Then proceed to draw out the lower prints one by one, placing them on top of the others, and if this is done continually while they are in the bath there will be little fear of irregular toning, which is certain to result if the prints stick together.

A concentrated toning bath, part of which is diluted for use, is generally the best for an amateur, who only tones at intervals, and the following will be found to be an excellent one:—

Chloride of gold	15 grains.
Acetate of soda	1 ounce.
Distilled water..	15 ounces.

One ounce of this to five ounces of water will tone a sheet of paper. This should, if possible, be made up about a week before it is required, as it works better when kept for some time, but when diluted for toning should be used immediately, and it will not tone more than once.

The prints should be toned to the colour they are wanted to be when finished, and as soon as each one reaches this point remove it to a large pan of water, which may be provided with a cover to protect the prints from light until all are finished.

Fix in hyposulphite of soda	4 ounces.
Water..	1 pint.

The prints may be removed to this bath from the water in which they

were placed after toning without any further washing, and allowed to remain in it for fifteen minutes. Great care should be taken in putting the prints into the fixing bath not to let any hypo get on them before they are immersed in the solution, as if it does, they will be stained. Stains will also be caused if they are touched with fingers having hypo on them. The prints must be kept constantly moving, for if allowed to stick together they will be imperfectly fixed, and when washed and dried will have yellow spots on them where they were in contact.

The hypo solution should always be used fresh, never using the same a second time, and in winter it ought to be slightly warm, as if too cold it acts very slowly. With paper which is liable to blister, it is advisable to dilute the hypo solution considerably as soon as the prints are fixed, leaving them in it for a minute or two longer, and then remove them to a pan of lukewarm water. Wash the prints, with the faces upwards, for about three hours, using a liberal quantity of water, which should be changed frequently, draining the prints well each time. The pan used for toning should be kept exclusively for that purpose, and also those for washing the prints before toning, and for the hypo solution, never using them for anything else. When the prints are washed they may be put between sheets of white blotting paper to dry, previously removing the excess of water from them with blotting paper so as to avoid wetting that in which the prints are placed.

THE FOCUSSING SCREEN.

By C. Oakeshott.

This, a necessary part of a camera, is very liable to be broken, an accident which not unfrequently happens when away from home, and under circumstances where a substitute cannot readily be found.

Every photographer ought to be able to grind one for himself. This is no difficult matter, the only requirements being a glass to fit the frame —a piece of stout plate glass about two inches by three—and some very fine emery. It is essential that the last item be very fine to prevent scratches, and the surest way to secure it in this condition is to prepare it oneself.

First obtain a small packet of the Wellington knife polish, to be had from any grocer. Next take two jugs—if of glass so much the better, as the settlement of the fine powder can then be readily seen (two tall tumblers will do nearly as well); into one of the jugs drop a spoonful of the polishing powder, fill with water and stir well. Leave it for a few seconds to allow the coarser particles to settle, then pour off the somewhat turbid water carefully into jug No. 2, and let remain till quite clear; pour back the water into No. 1, and repeat the process till a sufficiency is procured. The contents of No. 1 may now be thrown away, and if the deposit of No. 2 be again washed in the same way there will then remain a very fine powder, which may be safely used without risk of scratches. This can be dried and kept till required.

Now for the grinding. On a flat table lay an old newspaper; on this place the glass to be ground, in the centre of which drop a small pile of the washed emery, and moisten with a dilute solution of sulphuric acid, say one drachm to the ounce of water; then, in the right hand, take the

small piece of plate glass, and with a circular motion work over the surface to be ground, continuing till a satisfactory result is attained. Add acid, water, and emery as required. The powder which works over the edges can be scraped and used over again till the process is finished. An occasional rinse under the tap will show progress.

For my own screens I always use patent plate, as I doubt the perfect flatness of the glass now fitted to the general run of cameras. Flatted crown may be pressed closely to the rebate of the frame, and yet have ridges and hollows in other parts of its surface sufficient to give error in its focus.

TRANSFEROTYPES.

By A. Treyer Evans.

One of the most valuable introductions in the market during the past year is the Eastman transferotype film.

There seems to be little difference between their 'stripping film' and the transferotype, because in both, the emulsion is held to a temporary support, by means of a soluble substratum of gelatine; the emulsion being rendered insoluble by chrome alum or its equivalent. The difference (if any would exist) would be in the better quality and greater rapidity of the emulsion in the stripping film.

In the transferotype it will be noticed, when the film has been transferred (hence its name) to glass, that the cribriform reticulations of the backing paper have left their impress upon it, so that for lantern slides, where there is required the maximum of definition, the light has first of all to pass through the image-bearing film and then to be irradiated in all conceivable directions by impinging upon the 'mountains of gelatine' before it reaches the lantern screen.

To overcome these film denticulations I would suggest to any one who would like to 'take out' an improved patent to use, as a temporary support, some smooth surfaced paper. Sawyer's patent flexible support would answer exceedingly well, *i.e.*, paper coated with a solution of bleached lac in sodium diborate and then passed through hot steel rollers. I find by squeegeeing a piece of waxed support to a wet transferred print, and stripping when dry, these paper markings will be flattened down quite smooth.

In removing the backing paper with too hot a water the transferred film very frequently frills round the edges so that the transparency becomes useless. These waste plates I take and cut the film all round with a knife, and cutting shape, so as to line off the frilled edges, after which they are dipped in hot water up to this line and the strip carefully peeled off with a knife.

The yellow deposit in paper prints and films, when the double oxalate developer is used, is really due to the ferrous oxalate (a mustard coloured powder insoluble in H_2O) being precipitated from the solution of potassic oxalate in which it is soluble by dilution with water.

In a simpler manner, a print wet with the oxalate developer dipped into washing water dilutes the potassic oxalate, thereby precipitates the ferrous oxalate held in solution in the interstices of the paper or film as a yellow powder, which all the washing in the world I was going to say,

only geological remembrances prevent me, would not remove. By leaving the discoloured print for some time (the longer the better) in the following solution the yellowness will be completely discharged:—

Oxalate of potash	$2\frac{1}{2}$ drachms.
Acetic acid	60 minims.
Water	1 ounce.

When stripping the temporary support from the film, and hot water fails to solve the plain gelatine substratum, the addition of a few drops of acetic acid will aid one very much. I use this acid on account of the fact that gelatine is more soluble in it than anything we are acquainted with.

Save all the backing paper. After I strip off the paper in the hot water I turn it face upwards on a large sheet of glass to dry, or if I have a film that I want taken from a glass plate (which must have been previously waxed) I squeegee it down just as it is setting, let it thoroughly dry, then with a knife lift up a corner and strip. The result is a *glacè* print, or it can be retransferred to another surface. When a squeegeed print has not thoroughly dried it can be stripped off the glass without any preliminary waxing.

For negatives in which a double transfer has to be resorted to, so as to represent the correct right and left of the picture when it is on its final support, it is necessary to obtain a few sheets of Sawyer's patent flexible support from the Autotype Company, and cut them into sizes a trifle larger each way than the print to be transferred. On a piece of flannel pour a few drops of the following solution and rub speculum, polishing fashion, the face of a cut piece of the support, finally polishing off with a fresh piece of flannel.

The waxing solution:—

Benzole rectified	1 ounce.
Real beeswax	5 grains.

Afterwards immerse in cold water for five minutes or longer, together with the transferotype print, until perfectly flaccid, place the support face upwards upon a glass plate under the surface of the water with the print face downwards (*vis-ă-vis*), draw them rapidly from the water and apply the squeegee. Half an hour's pressure under a blotting pad and the backing paper can be stripped off in the hot water, leaving the image-bearing film on the flexible support. The film is now ready for its squeegeeing to its permanent support; when this has been effected and the flexible support thoroughly dry, this latter can be stripped off by inserting the point of a penknife under a corner and raising it. The image now left on its final support is correct as regards its right and left.

I much prefer this method of double transferring than that of copying through the glass plate on to the film. In the first place we reduce the defining power of our lens to a commoner level than a cheap French lens by the intervention of the glass plate when the film is away from the lens in the copying camera, and by the latter method we combine this evil with another, *i.e.*, the inability of printing from the surface on which the image was impressed, therefore loosing all the sharpest detail, which always lies on the film's surface.

After summing up and reviewing the merits and demerits of the different methods of reversing the transferotype image as regards its

right and left, I think it will be quite evident, that for lantern work at least, the double transfer method has no equal.

The colour of transferotypes, as well as all other bromide prints, I have found, depends wholly upon the rapidity of development. I think by a protracted development we obtain very much larger silver particles, and the colour then is more of a bluish-black, but by rapid development we can even hit a warm sepia.

THE NEGATIVE IMAGE.

By Thomas Bedding.

By way of supplement to some reflections on this subject which were offered by the present writer 'in another place,' a few months ago, a further consideration of what has less the characteristics of a chimera than appears at first sight, may be, at this moment of convenience, not unprofitably indulged in. The subject indubitably possesses all the elements constituting a virgin field of scientific research, and is one, moreover, of a nature highly suggestive of possible large changes in the economy of photography. Briefly surveyed, it predicates the eventual supersession of the existing method of obtaining an invisible developable negative impression in the camera with a short exposure upon, say, Ag Br, by an imaginary process which assures a visible and not inferior result by the single operation of exposure alone, the necessity for fixation being of course taken as understood. Upon such a consummation it can well be conceived that jargon terms like 'the latent image,' 'development,' &c., together with the masses of difficulty and uncertainty thereby entailed, would speedily have none but an antiquarian significance, and that such would be among the most trifling changes that would be effected by the perfection of a process for obtaining a visible negative image by the direct unaided agency of light.

It is instructive in studying the genesis of the photographic image to realise the peculiar fact that a consideration of the possibility, however remote, of taking a visible negative impression in the camera with the same relative degree of facility as we now obtain an *in*visible one, has been consistently neglected. There is not recorded, indeed, a single experiment that would favour the supposition that the problem had ever been entertained by the chemists. This dilute apathy is all the more strange if we consider that in the production of positive impressions on paper the photographic properties of Ag Cl with excess of Ag NO_3, in the presence of light, were early utilised, and are probably so destined to be for many years to come. Between silver chloride negative and positive processes there is, of course, no comparison whatever, much less a relative one, if time be admitted as a factor; nevertheless, the point stated merits reference in illustration of the neglect of the endeavour to produce negatives either by the direct or indirect action of light alone. Furthermore, in perusing the writings of the chief photographic experimentalists we are invariably met with the advice to regard the idea of a sensible impression on silver bromide by even prolonged exposure as out of the question. To which, while one subscribes a total agreement, there is the temptation to ask, Whether it may not be possible to obtain such an impression with a short exposure upon a film of sensitive emulsion $= x$?

Our knowledge of the photographic properties of the haloid salts of silver is undoubtedly very thorough, the investigations of which they have formed the bases having been of a most extensive and searching character. Little attention, however, has been directed to the characteristics of many of the organic silver salts that are decomposed by light, and possibly much that is valuable in this regard remains to be ascertained. Obviously we have not exhausted the properties of some among the better known compounds. For example, it was thought not long ago that fulminating silver might be found of use in rendering collateral aid in the production of the photographic image, but as it has not yet been safely shown how to render this salt innocuous while undergoing manipulation in the photographic laboratory, the experimentalists may be forgiven for fighting shy of it. That a compound of silver as the sensitive medium, or that metallic silver as the perfected photographic image, is likely to be replaced is not fair field for doubt, but that among the numerous salts formed by this valuable metal there exists one which, under conditions to be defined, would exhibit a hitherto unsuspected form of sensibility to light, and yield a negative impression unaided by a reducing agent, cannot be a wholly fantastic belief.

As regards the facility with which a visible impression may be obtained by the direct, although not unaided, action of light, we see, in the case of a positive process recently introduced, that an image may be vicariously formed in a non-sensitive substance by the behaviour of another salt, under the influence of the solar rays. The formation of a negative image in the camera by partly analogous means can therefore be suggested with more than a trace of feasibility, although so far as current data may be accepted, we must reject as impracticable all thoughts of adding a reducing agent to a sensitive silver salt in emulsion, while experimental attempts to render a prepared film visibly sensible to light by treatment with any known combination of reagents, immediately anterior to exposure, must also be similarly ranked.

The problem is beset with difficulties, and to state so much is to avow one's appreciation not only of the huge stumbling blocks of theory that obstruct the path, but also of the far more formidable points of practice that would have to be overcome before such a process could be completed and rendered amenable to the stern requirements of commerce. But that the negative image of the future will be not latent but instantly visible upon the impact of light is the deliberate belief of an humble individual who, upon another occasion, may seize the opportunity of tendering some reasons for the faith that is in him.

A MAKESHIFT STUDIO.

By J. T. Hackett.

The above studio was made out of a building (formerly a barn) measuring inside about forty feet long, eighteen feet wide, and twelve feet to the eaves, and about eighteen feet to the ridge. It has two doors, each being twelve feet high and five feet wide; it has a floor eighteen feet long by ten feet wide.

By means of a few yards of calico, copper wire, screw eyes, rings, and

the necessary backgrounds, &c., the above building was converted into a very useful studio, measuring eighteen feet by ten feet.

At first I fitted the above up so that the side light was formed by opening the doors wide and fastening them back. This plan did not answer because the contrasts were too great, and no reflectors I could get were powerful enough to counteract this defect. So I set to work and shifted the backgrounds, &c., until I found the light fell upon the sitter in a more harmonious manner. This position was exactly opposite the doors above mentioned.

I now stretched two copper wires from end to end of the studio, *i.e.*, one at each side of the background. On these wires slide pieces of calico about nine feet by seven feet, that on the left side being white and the one on the right side of some dark material. By means of two cords and a few screw eyes I have arranged pulleys in such a manner that can alter the lighting without leaving the camera end of the studio.

It will be seen from the foregoing that the *studio is only lighted by a high front east light*, and that it is about sixteen feet from the sitter, and is therefore rather weak, so care must be taken not to have the right hand piece of calico too dark.

The exposures required on bright clear days in September varied from two to thirty seconds, according to the time of day, &c., using a slow portrait lens, full aperture, Ilford ordinary plates, developed with the usual pyro, bromide, and ammonia developer.

I have a wire stretched across the front light, about six feet from the floor, on which slides a calico screen, which can be drawn from side to side when the sun is shining, but after about twelve a.m. the sun is off and it can be left open if desired.

TONING SIMPLIFIED FOR AMATEURS.

By W. Tylar.

Ninety out of every hundred amateur photographers pull long faces when about to tone. How is it that, after going successfully through far more difficult operations, they are scared by the toning process needful for producing a presentable picture?

Is it because there are too many formulæ given that they flounder hopelessly from one to the other, and do not give any a fair trial, or is it because the writers who give the formulæ leave some little details of manipulation out, thinking them too simple to mention? I think the latter is the true solution of the case; formulæ are given, but nothing is heard of the best condition of the print to get the full result of the formula mentioned. It is a fact well known by practical men that some baths require all the free silver to be soaked out of the prints previous to immersion in the toning bath, while by taking the prints in this condition to another form of toning bath the result would be simply a failure. *Different baths require the prints in different conditions if the best results are to be obtained.* To the best of my knowledge, I have never seen this pointed out before. Writers being so accustomed to what is requisite are apt to think every one else knows the same, and omit to mention a seemingly trivial item, but one on which the success or failure of a

process depends. No part of an operation is too simple to point out to a beginner in the art, and it is by attention to little things that great results are achieved.

An old favourite bath of mine, and one which has been bullied beyond any other, is the one I am about to recommend to amateurs. It is so simple as to be nearly automatic, and one that practically renders failure impossible. The tones can be varied from brown to blacks simply by longer or shorter immersion, and last, but not least, the prints are fixed while toning.

The formula is:—

Chloride of gold	6 grains.
Tungstate of soda	60 ,,
Sulphocyanide of ammonium	100 ,,
Hyposulphite of soda	960 ,,
Distilled water	8 ounces.

Now as to mixing this bath. First, be sure and obtain pure chemicals from a reliable dealer; then weigh out the tungstate of soda, the sulphocyanide of ammonium, and the hyposulphite of soda, and dissolve in six ounces of water. When perfectly dissolved, *and not before*, add your gold (the simplest way of measuring the gold is to dissolve a fifteen-grain tube in fifteen drachms of distilled water—you then have one grain in each drachm), shake up the solution well, and add water to make up to eight ounces. The above quantity I reckon to tone four sheets of paper. More can be toned, but I do not think any saving is effected by being too sparing with the gold. By stinting the gold you only waste your silver, both by having to buy fresh paper and losing time in reprinting, &c.

Now I presume you are ready for toning, so get down the dish you dedicate to this purpose exclusively, and see that it is washed perfectly clean. Then pour your toning solution into the dish and, by means of a piece of *red* litmus paper, test it for alkalinity. If in proper condition the paper will be changed to a slightly blue tone. If, however, the paper refuses to have a 'fit of the blues' a little stimulus must be applied by carefully adding drop by drop a little ammonia till the requisite result is obtained. Now trim your prints and, without washing of any kind, immerse them in the bath, when they will assume a colour rather startling to the operator, namely, a dirty yellow; but this should give you cause for joy, as it shows you are on the right track for success. Keep turning the prints about, and you will see the slow but marvellous change to the coveted hues required. When they reach the tone you would like, remove to water, and give them a good washing. This I consider a great advantage, as you know the prints, when finished, will be of this exact colour, there being no after process to cause any change, as in other methods.

It has been stated that prints toned thus are not permanent, but I have in my possession prints between seven and eight years old as good now as on the day they were toned. It has also been stated that yellowness of the high lights are obtained from sulphur deposits. I say any yellowness in the whites are the result of sheer carelessness, and are caused solely by an acid condition of the bath.

Be careful to get pure chemicals, and mix exactly as I describe, *always adding the gold the last thing* after the other ingredients are dissolved,

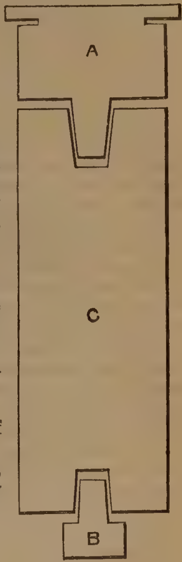
and always testing the bath and using it *slightly alkaline*, and success will attend your efforts.

The solution can be bottled up after use, but always keep count of the number of sheets of paper toned in the solution, and calculate one sheet for each one and a half grains of gold. When the bath has done this be satisfied, and throw it away.

Many Birmingham amateurs have found the above useful to them, so I give it in the hopes of helping others out of one difficulty experienced in practising our loved art-science.

HOW TO USE MORGAN AND KIDD'S SLIDE FOR EASTMAN'S PAPER.

By J. S. Dickin.



I have no doubt there are quite a number of photographers who have one of the above slides, and would like to use Eastman's stripping films in it without the trouble of unrolling and rerolling on Morgan & Kidd's spool. The way in which I accomplish it is as follows:—

Make two plugs or fittings of brass or hard wood, the former is the best, as per sketch.

A represents section of plug to go through the large hole in the top of Morgan & Kidd's slides, and into small hole of Eastman's spool.

B is to fit large hole of Eastman's spool, and small hole on the bottom of slide.

C is the Eastman's spool.

The measurements will vary with the size of roller slide, but no difficulty will be experienced.

I have sent this idea to several amateurs, and, as they are all pleased with it, now submit it to my brother readers of this popular and useful Almanac.

IN RE STRIPPING FILMS.

By J. A. Forrest.

During the reign of the 'wax paper process,' 1848, some operators tried the effect of placing the sensitive waxed paper in a bath of whey, or more properly 'caseine.'

It was thought by a maker of albumenised paper he would try it on his non-sensitised paper before albumenising. He made a bath accordingly, and along with other members of the old 'Liverpool Photographic Society,' I bought some of it; but mark my astonishment in discovering, after printing upon it in the usual way, from sensitising to fixing, that just as I had, as I thought, completed my work, the paper and film dissolved

partnership. I found on the paper an impression of a very undefined character, like writing on blotting paper, but turning my attention to the film I discovered the picture very finely delineated, and so tough that you could handle it without running the risk of tearing it.

Thinking over this accident I thought I might utilise it by covering a plate of opal glass, finely obscured on one side (*i.e.*, flashed opal), with a solution of common gum, allowing it to partially dry, then placing it in a tray with water, spreading the film over it, raising it out of the water to drain and dry, when thoroughly dry varnishing it.

I send one stereoscope I made forty years ago, during which time it has been exposed in a damp cellar, and does not seem in the least affected by damp or change of climate.

WHITE LETTER TITLES ON VIEWS.

By W. Holker Farrow.

The question is often asked, How is the white lettering done on the published views? and the answer is, The name is written reversed on the negative with opaque pigment. Now it is not every one who can do this lettering backwards, but most people can write a name neatly in the ordinary straightforward way, and to those persons who only want a few copies off each negative, but desire the title on them, the following dodge will meet the difficulty, and not damage the negative in any way.

Cut your paper to size before printing if possible, but in any case cut the bottom edge straight, for a reason which will be obvious, and then with a pen charged with *well mixed* Indian ink, or *opaque* water colour, write the name of the view you are going to print where you wish it to appear, and allow to dry before placing on negative. The ink is easily removed with a wet sponge before toning, leaving the title in white characters on the print.

Use a smooth pen and be sure your ink is opaque.

The above applies to the ordinary albumenised paper, but no doubt it could be used with equally good results on bromide and other kinds.

EXPERIMENTS WITH THE EYE AND PHOTOGRAPHIC SALTS.

By Friese Greene.

The operations of photography frequently give rise to very strange phenomena, which, in consequence of not having been studied, I am tempted to regard as anomalous; the most unexpected reactions and the most unusual effects frequently occur and mar the work of those interested in the science of photography. The phenomena, hitherto unexplained, must nevertheless belong to the series of ordinary chemical or electrical reactions, which careful study, guided by methodical analysis, must necessarily enable us to account for and disengage and isolate from similar circumstances. We know that light is the principal communicator to all things; though a silent agent, its power is immeasurable; though it produces effect of vision it is itself invisible. Most men say light is motion; yes, and I must say more than that. Any one may ask

me why. Well, I must give an answer. It is this. I have often wakened in the night and brought my imagination to work in this way, I close my eyes and imagine something going on before me, on the retina I have seen light dart in stars and then gradually change into a revolving scene of different colours, which slowly passes away, then I see no more without the aid of light of some kind (some kinds of light exciting my imagination much more than others). Now I say light leaves something *in* or *on* whatever it touches, and that is my reason for saying there is something more than motion. If I have not used my imagination before I go to sleep it lays latent until I awake, but if I have used it before I go to sleep it is exhausted. This is very curious; I have tried it often, and always had the same effect. There are many others which I have observed in practising with my eyes in daylight, and in darkened rooms. Looking at an ordinary gas jet in an otherwise dark room steadily for a few seconds and suddenly putting the gas out I see the flame gradually appear brightly and revolving in an upward direction—disappearing and reappearing; I noticed that the oftener I did this the clearer it appeared, especially if I did it as instantaneously as possible. Now what struck me most was the change of different colours as I watched the image fade away; this was a bluish green at the top part of the flame and black in the blue or transparent portion. Now if I look at the flame steadily for ten seconds and suddenly close my eyes, I see pink in the top part of the the flame with a greenish border, and the image did not revolve, it seems to be more fixed on the retina, but still the gradual change of colours went on. If I looked at the same flame for twenty seconds, I see the top part of the flame green, this changed to pink and gradually took a darker shade, the transparent part of flame appeared more vivid and was of a very dark green colour. Looking for thirty seconds the colour was dark pink with a dark blue border, and you could plainly see the quivering of the flame, also the combustion of dust going on in the transparent portion. Now and again the image appeared, as it were, illuminated from behind, a halo of light appearing round the image; this was very marked.

Now another experiment I tried on April 3rd. About five o'clock in the morning I suddenly opened my eyes and closed them three or four times, looking towards the window where the morning light was just peeping in, and I saw the most marvellous scenes and pictures combined with the most peculiar phenomena I have ever seen; closing my eyes I put a cloth over them to keep out any stray ray of light reaching them, I just saw a few bright stars of light appearing, as it were, at a distance. Still keeping my eyes dark for a minute or two I then saw flashes of electric spark, this I put down to the positive and negative of colours neutralising, for I believe from one end of the spectrum there is always an attraction and repulsion going on, then, after a little while, a faint picture—yellow mixed with a dingy green; the shapes were so various, it had the effect of broken wings each revolving, sometimes brighter and sometimes more dull, sometimes advancing and sometimes receding. It is very difficult to explain all that went on, and, strange to say, directly after this experiment the eyes are ripe for getting an instantaneous picture on the retina, so I placed an instantaneous photographic shutter before my eye, and looked towards the window, then suddenly snapped the shutter; there appeared on the retina, for a few seconds, a

beautifully sharp picture of the window-panes and scene outside. Now what is this effect on the retina of the eye?

There is one more experiment I should like to mention, one I did in the middle of a bright day, looking towards the window and at the scene and sky outside; the sky of course appeared the brightest. When I closed my eyes and held my hands over them, a scene gradually appeared, the colours were simply lovely: the sky appeared a brilliant magenta, such a beautifully transparent colour I have never seen before, this changed to a clear blue, and gradually to a beautiful green; I found by trying this longer the green changed to a pale yellow, which gradually deepened to an orange. What struck me most in this experiment was the colours of the spectrum and their order; where were the complimentary colours? Trying these experiments, and seeing the pictures and scenes so vividly, a thought struck me—Could we ever get an impression from the retina on a sensitised plate? so I first tried looking at a gas jet for a few seconds, then putting the light out, holding the photographic plate to the opened eye for a minute and developing, but after trying no end of times I failed, still being under the impression if I had a light strong enough or powerful enough, and the film or plate quick enough, I could obtain some effect, and, strange to say, I have, after no end of experimenting, succeeded in doing so, but only with an electric arc light of 2000 candle power, which I have at my place at 92 Piccadilly for taking photographs. I looked at the arc light for fifteen seconds, then switched the light off, and put a very quick plate to my eye, and held it there for a minute; on developing it, to my intense delight I found a spot; doing it again, I had the same effect; and if the spot is put under a powerful microscope you can see the image of the arc. Now I am under the impression this is most marvellous and interesting, and makes me wonder if we shall ever be taking photographs without any camera or lens at all.

There is something else I should like to mention connected with photography, and that is the latent image. I have been fifteen years continually studying, practising, and trying to find out what it is. We have three theories. The first one is, light acting on a silver salt threw the component atoms of each molecule into a state of vibration, the developer separated the metal from the haloid. Second, light reduced the silver chloride, bromide, &c., to a sub-salt being capable of being reduced by the developer. Third, which I think is the most ingenious, is by Carey Lea, and that is light acting on an haloid salt converts it into what he calls a photo-salt, which is a compound of the sub-salt. Now I can prove that magnetism and electricity have something to do with it. If I coat a plate with chloride of silver and dry it well, and place it on an ordinary horseshoe magnet and expose it to the light, I had two spots formed by the poles of the magnet. This is very strange to find magnetism acting upon the salts. Again, if you put a shilling on the film of an ordinary bromide plate and pour a weak solution of hydrochloric acid upon it, put the negative pole of the battery on the shilling, and a piece of platinum on the positive pole, you can develop the impression of the shilling although the plate has seen no light. I do not attempt to explain what the latent image is, but I maintain that the theories are wrong, for that magnetism and electricity have something to do with it. I am now gradually coming to the conclusion I cannot

live long enough to find out a millionth part of what I so wish to know concerning this one subject. Light is so true, and yet so false in some respects, but as nature's laws are always serious and true we can come to the conclusion that we are in error when anything does not appear right, but it is by the seeking and fumbling we learn; for truth, when we can fathom the complicated interferences we shall learn much quicker. The act of seeing has so many laws of interference. Though the eye is the camera and the retina the sensitive plate, we have still to find out that magnetism or electricity conducts to the brain and gives us the power of imagination, and no doubt the eye that can command the rays to the sharpest focus on the retina has the clearest perception of things conducted to the brain. I cannot help thinking that all is a physical process which will be solved as science advances, for each discovery must act as a lever for future discoveries.

ON KEEPING HOME-PREPARED SENSITISED PAPER WHITE WHILE PRINTING.

By A Silver Printer.

During the few hot days of the past summer I found it absolutely necesary to adopt some means for preventing discolouration of the paper while printing, more especially vignettes printed under tissue paper. While contemplating the preparation of blotting-paper pads with bicarbonate of soda, it occurred to me that there was a still easier way out of the difficulty, and I at once put it to the test, with the result that I have continued to use the method ever since.

After placing the paper in position on the negative, lay an old piece of sensitised paper over it before putting on the pad, and should the print be in the frame several days, owing to wet weather, slow printing negative, or other causes, it will come off almost as good as on the day the paper was floated. Any old print, untoned, will answer, whether on ready-sensitised or home-prepared paper.

Now the slow light is upon us, I am sure any brother printer who 'catches on,' will never give it up on account of the very slight extra trouble.

THEN AND NOW.

By G. H. E. Sutton.

As time has rolled along in the successive years since photography became an established medium of artistic production, that branch which relates to printing upon albumenised paper has remained at an absolute standstill, or rather has in effect travelled backwards; and nothing can be said to have usurped its place. Faulty as it is, as regards its permanency, and this fault has been greatly intensified by attendant circumstances, it still remains, of all practical processes, at once the most simple and the most beautiful. Its elder brother, the negative, has passed through various stages and evolutions, some of a most marvellous character; and seems to have absorbed nearly all the labour and research both of the scientist and the ordinary worker, until, humanly speaking,

little seems to remain to be improved upon. With various samples of prints before me, produced from one to twenty-five years ago, I am tempted to ask why it is that those which have longest braved the storms of time are still the brightest, richest, and most enduring samples of the art? It is true that the faces have not been retouched until they resemble Parian marble; but, as mere photographs, in crispness and brilliancy the elder are much superior to those of more modern date, and as yet show little if anything of that inherent taint of self-destruction which is so characteristically manifest in many of the others—some of which are of such a dingy, smoky nature as to be almost repulsive.

Again, why is this? More reasons than one may be cited. First of all, it is because of a want of strength in the negative; secondly, it is in consequence of a departure upon the same lines in the manufacture of albumenised paper. I shall not say that we ought to return to the harder class of negative, for without any controversy those possessing the more perfect gradation have much the more superior artistic qualities; but this I aver to be at the expense of both brilliancy and permanency. This is doubly concentrated in its parallel of a weakly salted paper, which has reduced its quality to effect a saving in silver. It is true that it possesses the glare which a double albumenising gives to it, but this is neither art nor true beauty. Being lightly salted and printed from a thin negative, the result is that the image is only impressed upon its surface, instead of being, as otherwise would be the case, embedded as it were through the whole fabric of the paper. These qualities, with careful manipulations and finish, are what have mainly given such enduring beauty and sterling worth to the older photographs of which I have spoken; and the lack of which has resulted in the production of so many sickly, weak, and jaundiced-looking abortions as of late years we have so often been accustomed to see. Let us then, for a time at least, leave off tinkering with negative processes and give up all our research to the improvement of what is still the one process in printing.

PIONEERING.

By Lindsay Hemery.

Hope lives in the future, reflection in the past. Our progress is all the surer and truer if we only take time now and then to pause on a vantage ground of observation to note the way we have come, and in the retrospect of our progress to find suggestions which will facilitate our further advance. And there is a poetry in these memories of the past that come to us as we con the pages of an ancient *Journal* or *News*, wherein is the record of old trials which have long been conquered and now forgotten in presence of new problems, and we see still how

> 'Men may rise on stepping-stones
> Of their dead selves to higher things;'

and take new hope and courage for further conquests.

Our beloved art-science is old enough to be a marvellous record of human achievement, yet young enough for the whole story to be near enough for him who runs to read. Though the tale is not yet complete, several chapters have yet to be written, other authors have to inscribe fresh

marvels, till in due course all the strange eventful history is unravelled and the volume is closed. It is not now my intention to touch on the probable lines of new additions, but, as the Irishman said, to progress backward into that section of photographic annals which may be headed 'Pioneering.' Before doing so, however, may I ask if the invention of 'dry plates' (marking such a distinct epoch) is ascribed to any individual? I believe the honour is generally considered a joint-stock affair, in which several gentlemen, well known at present, hold equal shares. But I think I have found an individual, totally forgotten, who appears to have taken the distinct first step on the ladder, and whose shoulders probably have been supporting all the other gentlemen ever since. (I hope nobody will be offended; I'm rather fond of metaphors.)

Now for the discovery. In *The Journal of the Photographic Society of London* for 1856, edited by Arthur Henfrey, I find the following article, which I transcribe verbatim as far as necessary :—

'THE USE OF GELATINE AS A PHOTOGRAPHIC VEHICLE.

'Among the different substances which have been employed for giving a coating to glass plates for photographic negatives, gelatine has not received that attention which it deserves. It is perfectly soluble in hot water, so that a beautiful even coating can be given to plates of any dimensions; it is but little affected by cold water, and yet is (like collodion) permeable to a considerable extent by a solution of nitrate of silver, and consequently is quick in its working, while the pictures produced are very intense in their dark portions and very permanent. In these particulars I have found it superior to albumen. Used in the following manner it becomes the medium of a process easy in its manipulation, and certain in its results :—

'Dissolve ten grains of ammonium in one and a half ounces of water contained in a medicine phial. Add to this twenty-six grains of gelatine. That sold under the name of Swinburne's isinglass is the best which I have had an opportunity of trying. Allow the gelatine to soak for half an hour, and then place the phial containing it in a vessel of water kept boiling over a lamp or fire. Shake occasionally until the gelatine is completely dissolved and carefully filter. Transfer the filtered fluid to another broad-mouthed phial, clean and free from dust, and proceed to coat the glass plates, keeping the phial hot in boiling water. The plates are coated precisely as with collodion, and when all the superfluous fluid is drained off at one corner, stand them nearly upright in a warm place to dry. Thus prepared they will keep for a long time, and are always ready for use. Excite with solution of nitrate of silver thirty grains to the ounce, expose in camera while still wet, and develop with sulphate of iron twenty-five grains to the ounce of water, slightly acidulated with tartaric acid. The time of exposure, of course, will vary with the nature of the light, &c., but I have found *thirty-five seconds* sufficient on a clear day with a common meniscus lens two and a quarter inches in diameter, and diaphragm three-eighths of an inch diameter, placed two inches in front of the lens. Fix either with solution of hyposulphite of soda (strong), or the pictures can be perfectly fixed by washing copiously in clean water, the only difference being that the yellow iodide then retained makes the printing a longer process than it would otherwise be. When washed stand the plate on edge and allow it to dry spontaneously.'

The writer here proceeds to give a few precautions which, he says, are necessary to ensure success, but as I do not suppose any of my readers will take up the ancient process, I need not enumerate them. One remark, however, I may quote :—'I have sometimes found the addition of two drops of glacial acetic acid increase the necessary time of exposure from forty seconds to six minutes under the same conditions of light, &c., besides gelatine, though not soluble in simple cold water, is soluble in an acid solution of nitrate of silver.'

The article is simply signed 'E. R., Tavistock, March, 1854.'

I have quoted sufficient, I think, to induce reflection on one or two points. Was 'E. R.' the first pioneer on the road of research that led to the discovery of the modern gelatine dry plate? I have heard of an Irish merchant who, when told by his clerk that he had lost a client's address, replied, 'Well, write and ask him for it!' No one I hope will suggest that I write to 'E. R., Tavistock,' to come forth and say how far his experiments took him. Alas! he may long ago have shuffled off this mortal coil and solved the One Great Problem. May he then be considered a 'sleeping' partner in the firm of Messrs.——and——, who announce that they were the 'original introducers of the gelatine dry plates?' On the other hand, may he now be the master-hand and guiding spirit of that great firm (or some other just as good)? But perhaps you will say he was only an amateur *dilettante*, amusing himself for the time. But I do not think that any one who took up photography in its most interesting period ever put it aside, though many put aside their own businesses to follow photography (my father being one). Even in such a case, however, his discovery had been made public property. What a pity we can only know him as 'E. R.' if we are to make him a 'Father of Photography!' But methinks 'E. R.' was a worker whose labours was its own reward. The article (which reads now like a photographic sibyl's) started a trail for others to follow up, and probably, as I hinted before, laid the foundation of a glorious structure. From taking a picture on a clear day in thirty-five seconds (1854), we are now within measuring distance of photographing the 'Flying Scotchman' travelling a mile a minute (1888)! If 'E. R.' himself reads this article, I trust he will forgive me for publishing his works and initials.

We to-day, who profit by the labours of him and others, should seek to put back something in return. Let us all be Pioneers!

'Nor deem th' irrevocable past
  As wholly wasted, wholly vain.
If rising on its wrecks at last
  To something nobler we attain.'

NOTES ON THE LATENT IMAGE.

By J. Barker.

The belief that electricity plays an important part in the formation of the latent image seems to be gaining fresh adherents after having been shelved for a number of years, and certainly electricity, although it has much to answer for, is capable of accounting for all the phenomena or actions brought into play; and that without the necessity of inventing a new theory for every fresh point involved, which is more than can be said

for either the mechanical, the purely chemical, or the wave theory, neither of which will satisfactorily explain the reversal of the latent image, nor yet why it is only the latent image that is reversed, as a sensitive film printed until an image is visible simply increases in blackness the longer it is printed, and no amount of over printing that I have been able to give will restore the film to its primary colour.

Again, if free bromine, chlorine, or iodine, are given off during the formation of the latent image, is it absorbed again upon reversal? And, if not, how can it keep on giving off the haloid at each reversal?

We also know that, for the purpose of obtaining clear negatives free from fog and reduction of any kind, a dense film is much to be preferred to an attenuated one, and this is explained by the fact that electricity diffuses itself uniformly over the entire surface of a metallic body. Hence, when the molecules of silver are not sufficiently separated, the whole becomes more or less excited upon the impact of light to any portion, causing fog and other troubles on development, whereas, in a dense medium, the molecules of silver are entirely isolated, and therefore only those actually acted upon are affected.

Briefly, I hold that there is no necessity to seek for some occult or profound process to be evolved from our inner consciousness, as we may be certain that the latent image is formed by and follows the same laws as govern all other matter, and, that the formation of the ultimate photographic image is a chemical action, and that electricity, in some form or other, is the cause of chemical action, therefore the origin of the photographic image is electrical.

And as we know that the latent image is formed by the action of light upon a sensitive surface, we have good reason to suppose the action of light to be electrical; and the factors in the case are simply:—A compound in which the molecules are saturated, and which upon the impact of light are disturbed and new affinities created which are dependant upon the atomicities of the compound.

PRACTICAL HINTS FROM THE PRINTING ROOM.

By J. H. Smith.

I have found that with foreign brands of paper a strong sensitising bath gives best results with short floating, from one and a half to two minutes (not more), the strength to be from fifty to sixty grains to the ounce, but on no account must the bath register less than fifty grains with the argentometer. To keep the bath neutral I take a piece of common washing soda about the size of a nut, in preference to the bicarbonate of soda, which entails a much greater loss by precipitation of silver. This I find added to the bath keeps it free from acid, and in proper working order. The residue should remain in the bottom of the bottle.

In keeping the bath up to its proper strength I take ten ounces of nitrate of silver and dissolve it in fifty ounces of water. This will give, on testing with the argentometer, a solution of ninety grains to the ounce of water. To the bath I add from this stock solution, after every five sheets floated, one ounce of the above, gently rocking the dish after so doing. This will be found to keep the bath as near its proper strength as is possible. The paper, to prevent waste of solution, should be drawn

slowly over a glass rod. For filtering the bath I use in preference to filter papers (which takes up much time and which means the loss of a great amount of solution) a piece of cotton wool put into the neck of the funnel and moistened with a little alcohol; through this the solution will filter very quickly, and be found quite clear and fit for use. If a large amount of work has to be done I think it is advisable to work two baths, using them alternately, and suning the other when not in use.

For toning I take one ounce of acetate of soda, and dissolve this in 120 ounces of water, adding fifteen grains of gold; this I let stand for twenty-four hours before using. For strengthening this bath I take one fifteen-grain tube of gold and dissolve it in one pint of water, adding one tea-spoonful of acetate of soda, and this I add to the bath after each day's toning. The foregoing is, of course, for large quantities of work. Every printer must therefore use the formula according to the amount of work he may have to do. I find in practice it is better to use two baths, working one every other day. This bath will be found to work slowly, but the results will be all that can be desired.

For fixing, I use a bath four ounces to the pint of water, fixing ten minutes. During the winter months great care should be taken of the fixing bath, which should be used tepid; also the first washing water should be of the same temperature. As I have found by experience that if a print is fixed in very cold hypo, on coming into the washing water it will be found that the albumen surface can be rubbed right off the paper on account of the cold water perishing the albumen. I trust these few hints may be of use to your younger readers who may be seeking knowledge through your valuable Annual, The British Journal Photographic Almanac.

WAXING PAPER NEGATIVES.

By W. Hooper.

I do not remember having seen in print an easy and certain way to wax paper negatives, and to those who are now using paper instead of glass my plan of waxing may be useful.

In waxing paper, using a sadiron as I have seen recommended, there is great danger of having the iron too hot and scorching the wax in the paper, thus spoiling the negative; or not having it hot enough, and leaving the wax in patches.

The temperature of boiling water will not injure wax, and the best way to ensure that temperature is to use a tin dish with a top soldered on rather larger than the negative, and about two inches deep. At the right-hand corner from you have a five-eight inch tube inserted three or four inches long, with an elbow standing up. The said tube must be soldered on above the water level. For using, pour about half an inch depth of water into the dish through the tube, place a Bunsen burner or a spirit lamp under the dish, and as soon as the steam issues from the tube place a piece of blotting paper on the top of the dish; let the heat dry this; next place a paper negative on that, which also let dry; then, with a piece of good white wax, rub all over the negative, place another negative on the top of the waxed one, and rub it well all over with a pad of cotton or other material. The top negative will absorb most of the

superfluous wax from the lower one, and economise the wax. Take off the first negative and place the second one in its place, and wax that, absorbing superfluous wax with another negative, and so on until all are roughly waxed. Then place each negative, with blotting paper under and above it, separately once more on top of the tin and rub over with the pad as at first. The negatives should now be perfectly transparent and ready to print from.

The top of the dish should be of stout tin; the other parts may be thinner. For large papers the dish may be made rather larger than half the size of the paper, and wax one half at a time.

I have negatives waxed as above over thirty years since, and they are as good as when first prepared.

A DEVELOPER, AND HOW I USE IT.

By Chas. F. Dickinson.

Thinking that it may be of interest to some of the readers of the Almanac to have a formula for a dry plate developer, which I have found yield most satisfactory results, I give the same, as also my experience with it. I may say that it gives very clear negatives free from yellowness, and that the whole detail in an under-exposed plate possible to obtain is brought out without any staining of the film. The developer I make up as follows:—

A.

Sulphite of soda	3 ounces.
Meta-bisulphite of potash	2 drachms.
Citric acid	1 drachm.
Water	112 ounces.
Pyro	1 ounce.

B.

Bromide of potassium	180 grains.
Liq. ammonia, S.G. 880	1½ ounce.
Water	112 ,,

C.

Bromide of potassium	8 grains.
Water	2 ounces.

Now to start development. Presuming the plate to have had the right exposure, I take equal proportions of A and B, mix and flow over the plate. Should it, however, show signs of over exposure, I immediately pour off the developer and flood the plate with water. I then take some solution, A, to each ounce of which I add one or two drachms of C (restrainer). I allow the plate to remain in this a few minutes, pour off and then continue with the former developer, when I generally find development to proceed satisfactorily to the end. Now, however, should the plate be under exposed, make up some developer, three to six parts B to one of A, and then add an equal bulk of water to same; allow the plate to remain in this until all the detail it is possible to obtain is out. And here I might mention, have patience. I have had plates under this treatment from three to four hours and then obtained a good printing

negative from a plate that under ordinary development would have turned out a failure. There is, however, one precaution necessary—the developer must be kept moving, otherwise the plate will probably show mottled markings. When all the detail that can be obtained is out, throw away this developer and take equal parts of A and B and bring up to the right printing density.

Of course a plate may be so much over or under exposed that no treatment will make a passable negative of it. And here I would impress on those readers who do not do so the necessity of making notes of the exposure, &c., of each plate. I am constantly receiving plates to develop without the least note as to lens and stop used, or under what conditions of light they were exposed; and as to subject—whether the interior of some gloomy cavern or the summit of a snow-clad mountain—well, I have to trust to my developer for that information. One other advantage this developer can claim is on the score of economy; the whole quantity can be made up for less than two shillings, and it can be used until exhausted, as it does not quickly discolour and keeps well in the two separate solutions for months. In conclusion, I may say I have used it on various brands of plates, both ordinary and extra rapid, with good results. I have also tried other developers, but like this one still the best, and trust any one trying the same will be equally satisfied.

ENLARGING.

By J. S. Dickin.

Having tried limelight and found it tedious, and daylight uncertain, I have used magnesium ribbon with uniform success.

I use a large camera which I made, and arranged a holder to carry the negative, which could be moved nearer or further from the lens as required. The negative is backed with a piece of ground glass or tissue paper. With stop $\frac{f}{22}$, and enlarging to 12×10 from an ordinary dense negative (quarter-plate), I use two feet of ribbon cut to six-inch lengths for convenience, ignited and *waved* about at back of negative. Since adopting this method I have not had a single failure. Brittania bromide paper is the one I use.

A 'FINISH' TO BROMIDE PRINTS.

By W. Holker Farrow.

A very good finish to bromide and other prints on matt paper is given by a plate mark, after the style of a steel engraving, and a simple method of producing this effect on moderate sizes is as follows:—

The print may be mounted in the ordinary way on India tinted boards, but a better effect, with some subjects, is to print them with a broad white margin. After the mounted photograph is dry, or nearly so, take a hard cardboard mount, a little larger than the printed part of your copy, slightly round the corners (if not so already) and carefully register in position on face of print, then on top of this place a smooth board or millboard; now put all together on several thicknesses of blotting paper in an ordinary letter-copying press, squeeze, and the thing is done.

If you have not a press available pass carefully once or twice through the common domestic wringing machine, of course, in this case, using millboard as a platen. An advantage of embossing your photographs in this way is that it takes the warp and twist out of the mounts.

To print the white margin referred to, a good plan is to use a mask made as follows:—

In a sheet of cardboard, about the same thickness as the negative glass, cut an aperture the size of the negative you wish to print from, place the negative in this opening in a large glass-fronted printing frame, gum a strip of black paper (lantern-slide binding) round the joint on film side of negative, taking care to keep it square, and the mask is complete.

FILM PHOTOGRAPHY.

By H. S. Bellsmith.

It is needless to expatiate upon the immense advantages of paper or film negatives over glass. All who have even a superficial knowledge of photography are fully convinced of this fact. The question is, Can films be relied upon to give as uniform and high standard of excellence in everyday use as glass plates?

In attempting to answer this query, we would ask those who differ from our conclusions to bear in mind that film photography is in its infancy—that the photographer, who by years of experiment and experience with the glass plate has learned by long acquaintance with its peculiarities to make fine work, has by this advancement in the art become critical and exacting, and is not willing, as a rule, to apply the same patience and study to overcome the obstacles which must as a matter of course *seem* to exist in the manipulations of a new process with which we are entirely unacquainted. It is for this reason that some photographers, who have established reputations for fine work with the glass plate, do not obtain as good results on films, simply because of their lack of experience with them.

Let us take a retrospective glance to the days of the 'wet plate' at the time dry plates were introduced. It is a noted fact that many of our best photographers, whose work had been of the highest grade of excellence, failed utterly to produce good results with the dry plate. It was not the fault of the plates; the plates were as good as are made to-day, although perhaps not so rapid, and, in fact, we believe some of the earliest plates were superior to the average plate of the present, for we think quality has been sacrificed to rapidity.

It is fair, therefore, to assume that most of the disappointment and failure in the adoption of the 'film' is due to the fact that they require vastly different treatment from the glass plate (but rarely get it). In our experience it is usually like this:—A photographer decides to 'try films.' He has, perhaps, like the majority, a 'favourite developer,' which he has used with wonderful success with Messrs. Gelatine, Chloride, & Co.'s plates, and therefore thinks of course it must be adapted to the films; it may contain enough sulphite or other chemical to make the substratum insoluble, but that is not considered, nevertheless, in case the film fails to strip readily. Mr. Photographer does not for a moment think *he* is at

fault, but immediately damns the films. Of course, that is only one way out of the many whereby the beginner with films fails to get what he expects. Now, is not this unfair treatment? Do you think that photographer made any better work with his first dry plate? No. It is more likely he used up box after box of plates, mixed up formula after formula to secure the best developer, and, like the rest of us, went through the usual category of troubles with green fog, yellow stains, flatness, harshness, 'fixing out,' and all the other things which it took patient and careful experiments and hard work to overcome.

The American films have been brought to that state of perfection, that very little improvement can be desired. Of course, we all hope to see the time when a transparent flexible film will be discovered that will do away with stripping altogether, but while many efforts and experiments have been made in this direction, we believe nothing practicable has yet been found, but while there may be room for improvement in this respect, it cannot be denied that the present mode of stripping is both reliable and satisfactory in results, and is withal a very interesting operation. We have recently been trying various formulæ for the development of films, and have arranged the following modification of our previously published formulæ, with which we confidently believe that films are capable of the most beautiful results, and are, on the whole, as thoroughly reliable in quality and uniformity as the glass plate.

DEVELOPER.

No. 1.

Sulphite of soda	6 ounces.
Dissolve in hot water	32 ,,
Pyrogallic acid	1 ounce.

Allow the sulphite to cool, then acidify with citric acid till blue litmus paper turns red, then add the pyro.

No. 2.

Carbonate of soda	3 ounces.
Carbonate of potass	1 ounce.
Water	32 ounces.

No. 3.

Bromide of potassium	1 ounce.
Water	10 ounces.

To develop, take:—

No. 1	1 ounce.
No. 2	2 ounces.
Water	2 ,,
No. 3	6 minims.

After development, wash in three changes of water, then soak for two minutes in the following acid bath:—

Sulphuric acid	20 drops.
Water	20 ounces.

Then wash in two changes of water and fix in:—

Hyposulphite sodium	4 ounces.
Water	16 ,,

Mix fresh for each batch of negatives. Use *no alum* in the fixing bath.

As the directions for stripping, &c., have been published frequently, and are contained in every package of film, we think it unnecessary to repeat them here.

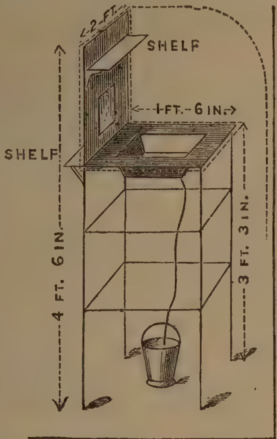
It will be noticed in the preceding formulæ, an acid bath is given and is recommended to be used after development and before fixing; this will be found to greatly aid the stripping of the paper from the film.

AN AMATEUR'S DARK ROOM.

By Edmund E. Fearn.

Amateurs are sometimes at a loss as to what they shall do for a dark room. A room to be kept on purpose is not always obtainable, and I think the following simple arrangement, which I have adopted, will be found very useful to many who, like myself, are short of room:—

The following sketch will convey an idea as to the construction. The



legs are made of $1\frac{1}{2}$ inch by 1-inch pine, the table and back being $\frac{1}{2}$ inch pine. The back is 4 feet 6 inches high, and the table 3 feet 3 inches high, by 2 feet long, and 1 foot 6 inches wide. Into the table is fixed a trough (mine is zinc), with a piece of tubing attached, which takes the waste water to a bucket or drain. In the back is fixed a sheet of ruby glass, with an extra sheet for use if necessary. Inside, shelves are fixed for bottles, &c., and outside, a shelf for a lamp if required to be used at night. At the top outside two brackets are fixed, to carry a zinc tank having a piece of tubing with a tap attached to supply water.

Round the edges of the stand (shown in sketch by dotted line), is

nailed black selisia of double thickness, which is made long enough to hang down like the ordinary portable tents.

The stand, when completed, will be found to make a very compact dark room, having an advantage of being always ready, and taking up very little room.

SYSTEMATIC EXPOSURE IN ENLARGING.

By E. Ferrero.

Enlarging is becoming a favourite pursuit amongst amateur photographers. The photographic press teems with descriptions of enlarging apparatus and instructions how to use them, but one looks in vain for any hint as to the exposure to be given. The usual advice on this very important point is to expose small pieces of the sensitive paper and to develop them until one is found to have been correctly exposed. This is a very primitive way of doing, and one which must cause great waste of time, and even failure, seeing that the actinic power of light is apt to vary considerably in a short space of time. There is no reason why a system of exposures should not be applied to enlarging, just as it is to the taking of direct photographs, as the same law governs both cases.

The table, which will be found on another page, is an attempt to introduce such a system.

If the light were always the same and the negatives to be enlarged from always of the same density, there would be only two factors in determining the correct exposures, viz., the *intensity ratio* and the rapidity of the paper or plate used. When we take direct photographs the distance from the lens to the focussing screen is always practically the same, but in enlarging this varies considerably according to the number of times we enlarge; it must therefore be ascertained every time. The ratio of the diameter of the stop to that distance must next be obtained. To simplify matters, a stop measuring one inch or half an inch in diameter should be used. Thus, if the distance between the lens and the focussing screen is found to be thirty inches, and the stop half an inch, the ratio will be $\frac{f}{60}$. The stop on which this calculation is made need not actually be used, but, having found in the table the correct exposure required with it, we can change the stop and alter the exposure in the same proportion as we would when substituting one stop for the other in taking direct photographs. '*The relative value of the stops remains the same at whatever distance the lens may be placed from the focussing screen.*'

As regards the second factor, viz., the rapidity of the material on which the enlargement is to be made, the table is made for Eastman's bromide paper and the Britannia *slow* bromide paper. The Britannia *rapid* paper only requires one-fiftieth of the exposures given, gelatino-bromide plates, showing 18° on Warnerke's sensitometer, one-fifteenth to one-twentieth, and Mawson & Swan's lantern plates three times.

The next factor in enlarging is the actinic power of light, and this we measure with an actinometer. The writer has found Stanley's actinometer to be a good one, and the table is made for this instrument.

To make the use of the table clear, we will suppose that the lens is working at $\frac{f}{60}$ as explained above. The actinometer is placed close to the

negative, and the time it requires to register the standard tint noted. We will suppose that the time is twenty-five seconds. We find this figure in the first column of the table, and following the line indicated we find, under the column headed $\frac{f}{60}$, that the exposure is five minutes seventeen seconds. I have mentioned above for what papers this would be correct, and what should be given to other materials.

The density of the negative now remains the only cause for uncertainty. The table is made for a clear and rather thin negative, just dense enough to give a good silver print. Negatives of different densities must have longer or shorter exposures in the same proportion as would be required in contact printing.

This table will be found useful also in making reduced transparencies, as the same rules apply.

NOTES ON STRIPPING FILM DEVELOPMENT, ETC.

By John Jackson.

Sometimes film negatives after stripping are found to be too weak to make good silver prints, although the same may make good prints on bromide paper; in such a case it is well to allow the film to dry on the temporary glass support without putting on the skin or final support, and having thoroughly washed the negative so as to eliminate the hypo, proceed to intensify with mercuric chloride followed either by weak ammonia, cyanide of silver, or sulphite of soda, then wash well, and in soaking the skin, it, being acid, must be rendered alkaline by immersing in water that has been made alkaline with ammonia—one drachm of ammonia to a pint of water will be sufficient for this purpose.

A good deal has of late been done in the development of stripping films by hydroquinone, and any specimens that have passed through my hands seem very fair negatives, but in my opinion they cannot come up in quality to those developed by the pyro, and soda, and potash method; and my experience is that this developer has the effect of softening the film, and I have had several cases where, in stripping, the film itself frills and blisters in the hot water, thus rendering the negative useless. Again, in many samples I have seen the negatives are rendered too black and white, and give too great contrasts in the prints. In my hands I must say that no developer approaches the sulpho-pyro and soda-potash formula, by which, by judiciously varying the quantities, any character of negative can be obtained.

Immediately after development my invariable method is to soak the films in a weak acid bath, say twenty to thirty drops of hydrochloric or sulphuric acid to a pint of water, allow them to remain in this for one minute, then wash well and fix. This not only clears the negatives, but also renders the process of stripping more easy and certain. Another word of warning is, never to allow the films to lie long in water before stripping; if they cannot be proceeded with at once dry them off on vulcanite sheets, and strip at any future time, by giving the films a preliminary soaking in the weak acid bath above referred to. I have had complaints from some workers that the films leave the collodion and frill at the edges; the cause of this is that, in coating, the collodion has been allowed to dry before immersing in the water; it should *not* be

allowed to dry, but only to set and then be well washed until the ether and alcohol are thoroughly displaced and the pores of the collodion filled with the water, the object of which is to keep these pores open until the gelatine film is squeegeed upon it.

I have added these notes as supplementary to my article of last year, and, in conclusion, wish the readers of the ALMANAC a merry Christmas and a prosperous new year.

EVAPORATION OF VOLATILE LIQUIDS.

By Rev. H. B. HARE.

A VERY simple and effectual way of preserving volatile liquids, such as ether, chloroform, ammonia, &c., from evaporation is first to secure the stoppers, as usual, with small twine, and then, having labelled the bottles on the bottom, to invert them, stopper downwards, into a vessel half filled with water, or so that the necks are covered by about two or three inches.

A preserved meat tin, with wires crossing each other at right angles (to keep the bottles separate and in upright position) will answer the purpose well.

This plan I find much handier than tying bladder or leather round, or luting common corks over with sealing or paraffin wax; and, last, but not least, many a nasty and noxious vapour will thus be trapped from entering the olfactory and respiratory organs of the operator while working in the confined air-space of too many laboratories of the present day.

SUGGESTIONS.

By A. L. HENDERSON.

THE above title is given to avoid a definite formulæ. Many of my friends, when I give a formula, do not at first succeed, perhaps from a reason that my instruction may not be complete enough, or from some inexplicable cause, yet I cannot but think that there is a great deal of pleasure in working out a process personally. The moment an experiment becomes a success the charm is gone. Permanent ready sensitised paper (so-called) has occupied my attention for many years. I have made many thousands of experiments in this direction with varying success, and I may say that there is none as yet prepared and in the English market that will produce results to my standard, viz., freshly prepared fumed paper. The best I have as yet found is of French preparation. Readers must not think that there is any difficulty in making paper keep white. Nothing is easier. Citrates or tartarites added to the sensitising bath, or the paper floated on the back, will impart this quality, but the difficulty of toning increases in proportion to the amount of preservative used. Sensitised and interleaved with paper impregnated with soda carbonate will keep paper for a long time. Why not convert the free silver (the delinquent) into another compound, *i.e.*, one that will be of a more permanent character, and yet give rich brilliant results? I venture to think that a modification of a process I published some time ago, 'Argentic stain,' would answer well as a preservative, omitting the citrate and the large

quantity of gelatine (some of these plates have kept well for years), or, perhaps better still, take a given quantity of ammonia carbonate, saturate it with silver, then float the back of the paper (previously sensitised) on it. The addition of a little soda acetate and some gum might be an improvement.

One more suggestion of a different character, viz., on producing grain for mechanical printing. Put some ground glass with the negative emulsion, or in the positive print. After the film has been well chrome alumed and dried it is to be subjected to the action of hydrofluoric acid. This will dissolve the powdered glass, and when washed and dried will show a fine grain of different depths. A mould may be taken from this by any of the well-known methods. I have for many years intended to work out a process somewhat embodying the above idea, with this difference, that an impression was to be taken (from a gelatine relief) in enamel, and vitrified on a dark ground in imitation of cameo. All the aforesaid matters were on my programme for future experiment, but from the shattered state of my health I will be compelled to bid your readers a long farewell.

A FEW HINTS ON WORKING THE OPTICAL OIL LANTERN.

By C. D. Bishop.

In oil lanterns there are various qualities—some appear to be made in the same way as pots and pans, utterly regardless of any laws of combustion; others are constructed on scientific principles. The best results, of course, are obtained from the latter. I have often been asked the question—What causes my lamp to smoke? Several things will cause this; a stuffy room without any means of ventilation and filled with people is often the cause. I heard from a gentleman who was using his oil lantern in a lecture hall, that his lamp refused to burn in any way except with a dull, sickly, yellow flame; in fact, he had to close up his exhibition. The same night he tried his lantern at home; the lamp burnt well, and he obtained his usual good results. He went the next week to the same hall, which was well filled as before; but, alas! his lamp refused all coaxing, and only burnt with a sickly flame as before. Until now all means of ventilation had been closed and the room was crowded; but as soon as the windows and ventilators were opened, the lamp commenced to burn with its old vigour and whiteness.

The cause very often of the lamp smoking or giving a yellow light is that the perforations in the lamp, through which the current of fresh air passes, are clogged with dust; and very often the burnt carbon of the wick is allowed to accumulate between the wick tubes, and to make it worse often becomes saturated with oil, and thus causes an unpleasant smell when the lamp becomes heated. Bad oil will also cause lamps to smoke. Do not put camphor in the oil, it only clogs the wicks and prevents capillary attraction. Best results are not obtained from hard wicks; if the oil is left in the lamp they become hard, and ought to be replaced with fresh.

When the glasses crack in the Russian iron lamp, mica, if clear, is a good substitute. Ordinary window glass cut to the size and boiled for some hours will resist heat. Those possessing Pamphengos need not

fear of the glasses cracking with the heat; I have never known one crack yet. The causes of condensers cracking are often as follows:—Lamp too near the condenser, a current of cold air from a window or door playing upon the lantern. Do not turn your lantern out suddenly, do it very gradually; and do not allow a draught from an open door to play upon it.

Cleanliness is a very great thing with the oil lantern. Bad oil will cause a smell which is unpleasant; but a dirty lamp saturated with oil (as they often are) is worse. Kerosine I find the best oil, it has no smell and appears quite clear.

PHOTOGRAPHY IN THE ISLE OF WIGHT.

By S. W. Woolley.

It is most likely that there are some who do not know (photographically speaking) this pretty spot of their own country, and it is for their special benefit and for others who experience a difficulty in finding field for their camera that these few remarks are written.

To begin with, I may say it is really one of the loveliest spots for a holiday, variety so charming being here in abundance. The island is familiarly spoken of as the 'Garden of England," in allusion to its general fertility and a climate fitting it especially for invalids. Communication with the mainland is kept up by several lines of steamboats from Portsmouth, Stokes Bay, Southampton, and elsewhere.

Landing at Ryde, a few pictures may be made of the Esplanade and street views. There is a dark room for amateurs at a local chemist's. Travellers by rail will be at once struck by the fact that the Railway Company are several years behindhand when contrasted with mainland train service, and, being warned, they must not be surprised at either the charges or speed, and on this account walking or cycling will often be found far preferable.

Sandown ranks as one of the chief seaside resorts in the island. On the sands some instantaneous pictures of seaside life should be attempted. A little further is Shanklin, the older part of which is very quaint, and here the beautiful Chine, a deep chasm in one of the lofty cliffs, will claim the use of some plates, and form 'beauty spots' in any album of picturesque scenery.

Ventnor is chiefly remarkable for its delightful climate, which, unfortunately, we cannot transfer to our albums. There are near here several examples of truly grand cliffs. At Bonchurch the chief object is the old church, now disused, and a sweetly pretty street scene may be obtained with the Pool on one side. From Ventnor there are coach excursions to Black Gang, and the wild scenery with its rugged magnificence well warrants some plates.

The western side of the island is as yet without railways; it is best reached by water. Plenty of excursions to The Needles, Alum and Freshwater Bays are announced in the season. From the immense cliffs at Freshwater there are some unique views which the camera cannot do justice to, in fact cannot attempt.

Going inland, Newport is tolerably interesting. Near here is Carisbrooke Castle, which, irrespective of its melancholy associations with the

martyred King Charles and his family, is a fine old castle, supposed to have existed before the Roman Conquest, although its features are now Norman. What is said to be the window of the bedchamber from which King Charles tried to escape is shown, and from this association is worth a plate. In Newport Church there is a monument to Princess Elizabeth, the King's daughter, who died a year or so after her father's execution. This monument was placed here by the Queen in 1856, and had better be photographed as a link in the series of Carisbrooke views.

At Cowes, the chief port of the island, are many chances of making pictures of some of the fine yachts of which the harbour abounds in the season; or a photograph of the parade, including some boats, makes a change on ordinary views. Near Cowes is Osborne House, a residence of the Queen. It is a modern mansion in the Palladian style; but of course permission must be obtained to photograph it.

Whippingham Church is well worth a plate or two. The chancel is a memorial of the Prince Consort. Norris Castle, a seat of the Duke of Bedford, is particularly noble in style. A glimpse of it can be got from the steamboats. It is worth attempting an instantaneous picture of.

These are the most important features of the island; but the tour may be considerably extended, if wished, by striking out in new directions, when objects, as yet unphotographed, will, without doubt, be brought to light.

A SOAPY SUBJECT.

By J. Lendon Berry.

I am going to write on a subject that I have no doubt has been known to many photographers before these lines will meet their eyes, but I think that there are even now a few old hands that will find a new face to their old friend in some of the uses to which he may be put.

The old friend to whom I allude is soap. It is well known that soap is a very useful article to the housewife, but it is of equally as much service to the photographer. Where is the reception-room assistant, who knows the business, that does not use what is known as soft soap on the young masher who is undecided as to how he would like to be taken, in order to induce him to give an order for a more expensive portrait than he at first intended when he came in? Or where is the operator, who is a man of business tact, who cannot, by a judicious use of soft soap, get up a better expression on the face of the good-looking young lady, just as she is settling down to a look of stony immobility, and thereby succeed in getting a life-like portrait, full of expression, when otherwise it would have had a dull, apathetic look that would have failed to give satisfaction.

Soft soap is good when used with discretion, but beware of using too much as it might lead to a fall if used in the wrong place. But it is hard soap that I have more especially to deal with in this paper, in pointing out a useful friend to every photographer.

Has it ever occurred to any of you when out on an expedition, or at home in the studio, to let your camera get an unfortunate knock, which did not exactly make it fall to pieces, but which made it leak light in one or more places? If you have, why, soap is your friend. Have you

a flange of the best English made lens that lets light into the camera between the wood and the brass? Then again, I say, soap is your friend. Should you even have a dark slide whose hinges or rebates are not so good as when first made, here again its friendly aid may be of use, as it can be freely rubbed in after the plate is placed in the slide without cementing the parts together, as the soap will allow the shutter to be opened in the camera, and may be rubbed in again on withdrawal from it.

In short, if there is a hole or a crack in the camera or slides from any cause whatsoever, soap will remedy it without any trouble.

Firstly, because it can be obtained almost everywhere.

Secondly, because you can squeeze it into any place; and,

Thirdly, because it is opaque, and therefore stops the passage of light, so I repeat again soap is the photographer's friend, and a piece of soap should form a part of every photographic outfit.

ON HANDY WORK.

By Charles Stephens.

To those whose work with the camera lies by the sea or on board steamers or other craft, the following simple method of taking hand-shots may be of service. Many must have found the inconvenience, when trying to capture views of yachts or other moving vessels from a pier-head, of having to move the tripod rapidly from one part to another as each fresh subject came within range.

Having for some few years found the advantage of being able to use a 5×4 camera while held in the hand, it occurred to me to try what could be done with a larger one. My camera is a $7\frac{1}{2} \times 5$, of rather heavy build, and I feel sure that one of a much larger size might be used in the same way.

I had a brass button screwed into each side of the camera front at bottom, to which a strap is attached which passes over the head, the tail-board resting against the chest, to which it is pressed firmly by the left hand placed under the camera, leaving the right free to work the pneumatic ball of the shutter. Two brass knobs, which might be made in the form of the fore and back sights of a rifle, are screwed into the top of the front and back of the camera respectively, and pass through two holes in the focussing cloth. These form the sights, so arranged as to give the centre of the field 'when brought into one.' With a very little practice perfect steadiness is obtained and the horizon kept level, or so nearly so that a very slight waste of margin in squaring the prints will put it right.

I got several successful negatives last June from an open boat sailing in a moderate breeze with a Kershaw shutter, and this I consider a pretty severe test of the mode of working.

HOW TO REVIVE BUSINESS.—BAD TRADE.

By W. T. Wilkinson.

Photographers everywhere are complaining of lack of business, and instead of trying to stimulate business they are doing their very best to

make bad trade permanent—first, by continuing the use of albumenised paper for printing upon; and, secondly, by totally ignoring the various branches of photo-mechanical work that are gradually being taken up by firms almost alien to such work, but who are obliged to do it to keep pace with the times.

Photographers as a body have long ago given up any idea of making albumenised paper prints permanent, and their customers, the general public, are also slowly but surely finding the same thing out, and consequently will not buy photographs which they know only last for a year or two, and unless a change is made business must continue to get worse instead of better.

Now with regard to the second reason. Within the last year or two photo-zinc blocks and collotype prints have come very much to the front, and as would-be customers cannot get photographers to supply them, they are inducing lithographic firms to take up photo-mechanical work, the consequences of which will be, in a few years, all the outdoor work now done by photographers will be put into the hands of lithographers, who will be able to supply copies absolutely permanent at a tithe of the cost of a silver print warranted to keep good three months. The production of collotypes does not require very extensive plant (unless on a large scale), and as it is quite as easy to make collotypes 24×18 as half-plate, a large business can be done in large-sized views, groups, &c.

Photo-zinc blocks or photo-lithography call for no great expenditure in plant, and are certainly not more difficult to master than any other branch of photography, but I would specially warn those who go in for these processes not to attempt them with makeshift appliances, as that will be certain failure; get proper tools to begin with, then success is certain.

ON MAKING NEGATIVES FROM PAPER PRINTS OR BOOK ILLUSTRATIONS.

By Clement J. Leaper.

In making negatives of anything on paper it is essential to hide the grain as much as possible, and the light most suitable for that purpose is one coming from above. In other words, the object to be copied should be horizontal, and the camera pointed down at it, the side lights of the studio being temporarily blocked out, and only the top light utilised. Not only is the end in view perfectly attained by operating in this manner, but the print or book being placed on the floor much less difficulty is experienced in adjusting it than if it had been propped up vertically as is usually the case.

A camera stand suitable for this class of work can be easily made from an old studio stand by cutting off about six inches from each leg and fixing three pieces of board shaped like a right-angled triangle on the top of the movable upright. To the board representing the perpendicular of the triangle the camera can be readily affixed by its usual screw, the lens pointing downwards and the ground glass being horizontal. The stand will be top heavy in such a position, but by driving a screw through the opposite leg and into the floor perfect stability will be attained.

A developer, made up as follows, has been found to answer the purpose admirably, when the object was to obtain the greatest possible contrast, as in making small negatives from book illustrations to be subsequently utilised in printing transparencies :—

Sodium sulphite	30 grains.
Potassium carbonate	30 ,,
Pyro	3 ,,
Potassium bromide	3 ,,
Water	1 ounce.

Development takes place very slowly, and should be invariably followed by soaking the plate for fifteen minutes in a solution of chrome alum containing ten grains to the ounce of water, and acidified with five drops of strong sulphuric acid. This clears away any stain and reduces the chance of frilling to a minimum.

The slow Ilford plate is the brand employed by the writer with this developer, but it would doubtless suit other makes equally well.

WRITING TITLES UPON NEGATIVES.

By Sylvester Parry.

Inquiries having been made lately in the pages of The British Journal of Photography, and amongst members of one or two societies, as to a simple way of writing the titles upon the negatives, the following easy process was 'worked out' by the writer many years ago. Of course the correct plan is to write the name and number backwards on the negative in Indian ink or black varnish; the difficulty, however, is to write backwards neatly.

By adopting the following method the difficulty is overcome, for the name of the subject or place is written in the ordinary manner :—Take a piece of talc, *carte* size, and cut it into small strips sufficiently long and broad for the purpose. Upon these slips of talc, with either medium previously mentioned, write the title of the negative in the usual way. It is more effective, however, to have the wording in very small block letters, known to printers as sans-serif. Lay the talc, with the inscription upon it, aside to dry. During the drying take up the negative and, with a soft silk handkerchief, very *gently*, clean, locally, the spot decided upon for the talc tablet. With a camel's-hair brush charged with colourless varnish, and one that dries transparent without heat, brush over the place decided upon, on the negative, for the tablet. Now take up the strip of talc with the name on, and carefully adjust it into position (of course with the written side from you) on the wet varnish. Gently rub the back of the talc to ensure perfect adhesion between the surfaces, and set aside to dry. This is a very neat and simple plan, and if the talc is thin no marks will be detected on the negative or print. It is, of course, understood that the negative has been varnished before adopting this plan.

A word of caution here may not be out of place to those who write the name in varnish, going over the wet varnish with bronze powder. The effect, though good, is only temporary, for the time speedily arrives when the negative (locally, of course) is ruined, not to mention the action

of the bronze upon the silver print. Do not rely upon the protective power of the varnish to prevent the injurious influence of the bronze.

A few years ago, to ensure neatness in the titles upon some valuable negatives, the writer had them printed by ordinary letterpress, and in printers' ink, on the talc. For two or three years all remained right, but ultimately an action detrimental to the negatives was started; the words gradually disappeared, and a peculiar crop of crystalline markings made their appearance, which, spreading right and left, ruined the negatives at those particular localities. Moral: Eschew bronze powder, in all forms and preparations, from the laboratory; and, regarding printers' ink, be satisfied with its legitimate use on paper, but do not trust its action on your negatives.

PLATE-ROCKING CONTRIVANCES.

By Robert Offord.

In a former Almanac there was an illustrated description of a rocking table for the dark room, which consisted of a vertical arm of iron, one end of which was attached to a cross piece resting on knife edges near the ceiling of the room, or projecting from a shelf, and the other end was bent at right angles and carried a small table or support for developing dishes. In my experience, under such conditions the solution would never wave properly over the plate, only the slightest possible disturbance taking place. Such a contrivance seems to act upon the principle involved in the old trick of turning a pail of water upside down without spilling a drop by carrying it rapidly round in a vertical circle at the length of one's arm. The following little experiments taught me something, and may, perhaps, be of use to some brother professional or amateur.

Requiring a rocking table in a dark room, the ceiling of which was rather low, and the space underneath the operating table fully occupied, the plan was tried of hanging a board by string in a simple manner, which occupied only a few minutes. The board was nine inches by seven. Two pieces of string, each eight feet long, were attached to corners of the board by nails, one piece by its two ends to the corners of one of the narrower edges of the board, and the other string in the same way to the opposite corners. The centres of the strings were then nailed to the ceiling (a boarded one) nine inches apart, and thus the board was evenly suspended in a horizontal plane in front of the dark-room window by four cords.

This was practically similar to the device referred to above, only the cords were substituted for the elaborate iron arm with its supports or points of suspension. Consequently it failed in the same way. Even when moved through an arc of twenty degrees there was scarcely the least wave, and paper dropped into the dish was apparently quite still. One little thing more was required to perfect it. A slip of thin wood, ten inches long and two inches broad, happened to be at hand, and this was nailed on the ceiling to separate the pairs of cords, so that, looking up at them, instead of presenting the appearance of two inverted V's with very small angles, they looked like two capital A's with the tops cut off down to the cross bar. Away went the solution out of the dish, suggesting a considerable diminution of the arc of oscillation.

A heavy board is better, and it is well to make it large enough to hold two or three cabinet or quarter-plate trays. Use a piece of dry wood and coat it well with paraffin wax. The cords also are better for a dip into hot wax, just the ends of them which may be splashed.

I have made many ordinary rocking tables with pendulum and weight, but have always substituted pointed screws and brass plates with shallow taper holes in them for the knife edges, as the table cannot shift in either direction. But I prefer the suspended board when practicable, especially on account of the ease with which it can be quickly removed and placed on a shelf or hung on the wall, so leaving a clear space for other work where space is of great value.

A SUBSTITUTE FOR THE FOCUSSING CLOTH.

By J. Leisk.

However necessary the focussing cloth is to the photographer, there is certainly nothing artistic in its appearance nor pleasant in its use, not to mention the ridiculous figure one cuts and consequent loss of dignity he suffers by wrapping up his head in a black cloth for the delectation of an admiring group of gamins; or, again, in stormy weather the behaviour of said cloth does not either conduce to sweetness of temper nor the safety or steadiness of the camera.

To avoid the troubles hinted at above, and abolish the focussing cloth altogether as such, I have adopted a contrivance which answers the purpose so well that a description of it may interest some of the readers of the Almanac.

It is virtually a conical bellows made of thin, black, light-tight cloth (good black woollen sateen coat-lining answers admirably), in shape like a camera bellows, the wide end being kept in shape by a light oblong wire frame, same shape but a little less in size than the ground glass frame of the camera, to which it may be attached by two loops of strong elastic on each side, which are buttoned on to a corresponding number of pins, such as shield tacks or small screw nails, fastened into the *outer* sides of the focussing glass frame. This holds the open or wide end of the bellows in close and light-tight contact with the focussing screen. The other end of the bellows is closed by a thin oblong square of blackened wood (about $4 \times 2\frac{3}{4}$ inches for a half-plate camera). In the centre of the wood a hole one inch in diameter is cut. The sides of the bellows are kept distended by a series of similar wire frames to the first, each a quarter of an inch each way less than the last, and sewn in position on the inside at suitable intervals, say an inch or an inch and a quarter apart, the wood end being a size less than the smallest frame. The whole folds into a quarter of an inch thickness, and draws out to about eight inches. It is drawn out by grasping the wooden end, and the eye placed close to the hole in the wood the image to be focussed can be seen as distinctly as if the whole head was enveloped in the focussing cloth, and the bellows being very flexible the eye can be brought opposite either centre or corner of plate as desired.

The bellows can be collapsed flat against the focussing screen and a focussing glass be placed over or through the opening in the end, but I prefer using an eye glass of about six-inch focus held over the opening

with the thumb, thus bringing a larger part of the screen under examination.

If the camera racks out from the front then can the foregoing contrivance be permanently fixed to the focussing screen, which it will serve to protect; but if the tailboard folds over the ground glass there may not be room for it when the camera is closed, in which case it must be made detachable as indicated.

I have found the foregoing contrivance satisfactory under the most trying conditions of weather. It is easy to make, with the help of a lady friend to do the sewing. It costs only a few pence, and if any of your readers who, like myself, work for *pleasure*, give it a fair trial, though they may still carry a black cloth to protect defective workmanship in camera or backs from the light, I do not think they will continue to decorate (?) themselves with it in public.

WHITE PICTURES BY THE 'BLACK ART.'

By W. C. Hall.

In writing the following—although the idea suggested itself to me—I do not say that it is new. Such an adaptation of an old process is, to say the least, palpable, and therefore has very possibly been tried by some one; but as I have after some search failed to find any record, I thought it as well perhaps to bring it forward for the benefit of those to whom it is new.

The method of production of ordinary carbon prints is well known—by a dark pigmented tissue sensitised with bichromate of potassium, exposed, and developed with tepid water, and transferred to a light ground.

Now the converse process of a white or light tissue treated in the same manner and transferred to a dark support will be found to produce equally beautiful results.

For the preparation of this pellicle, sulphate of barium will well supply the place of the dark pigment. No doubt a substitute could be found (and the ingenuity of each individual operator would doubtless devise a medium), but as regards purity of colour a better one will require seeking. The gelatine ought to set quickly, as if kept long in a fluid condition the heavy sulphate of barium would generate an affection for the goal to which a brick aims when thrown into water, *i.e.*, the bottom, and as that would be the side of the film to be dissolved out to form the image, most of it would be washed away and a poor result obtained.

Sulphate of barium (which by trituration should be reduced to as fine a state as possible) may be obtained from any soluble salt of barium by adding some soluble sulphate, the 'mountain snow' being precipitated, during which double decomposition takes place. This precipitate should be thoroughly washed to free it from all trace of acid, and carefully tested with a piece of blue litmus paper: any acid remaining would tend to render the gelatine insoluble. Prepare the tissue in the ordinary way as for carbon prints, but substitute sulphate of barium, *quant. suff.*, for the dark pigment. Expose behind a transparency, transfer to final support, and develop carefully with tepid water.

There are advantages in this process that cannot be claimed by its 'negro fraternity,' viz., an image being formed by the oxidised bichromate of potassium, no actinometer (that *sine quâ non* of the process) is required to judge exposure, as by the depth of this image so one is guided as to time. On account of the colour of the tissue the light penetrates more quickly, and less exposure by far is necessary; owing to this it can be worked in duller weather than ordinarily.

Possibly after all the operations are gone through there still remains a primrose tint. This arises from the difficulty of washing out every trace of the bichromate. To some pictures this lends a kind of enchantment, but in the majority the preference lies with the pure white; and to those who would wish to dislodge this chromatic intruder, I would recommend soaking the film, when developed and washed, in a medium strength solution of sulphurous acid.

Pursuers of the quondam rage (ferrotype) need no longer pack away their spoilt plates, for the white tissue being transferred thereto, imagination can picture a revivifying of the primordial occupier.

Any smooth surface of a black or dark nature offers an abiding place for the developed print, *e.g.*, ebonite, black door-plates, black marble, or stone, and others *sans nombre*. If black paper be prepared with gelatine and chrome alum it may likewise serve as a support, and this can be mounted on cards in the usual way.

The feasibility and adaptability of the above does not need much consideration, for as it is seen that the carbon process consists in laying a darkened film on a light ground with the effect of producing most beautiful results, so it is evident that a white or light film when laid on a dark ground must likewise give results which should not be far inferior to the 'normal' process.

THE FLAP SHUTTER.

By Russell Sedgfield.

It has sometimes surprised me to notice, even in these days of instantaneous shutters, how little mention is generally made of the simple flap shutter. When exposures are not very quick—that is, when they are longer than three or four seconds—this shutter often in landscape work, and not infrequently in architecture, is the simplest and best that can be used. By it, when the horizon is moderately even, an exposure of less than a second can be given to the sky, and as much longer as is thought desirable to the foreground. It is merely necessary to get an approximate idea of the position in which it will cut off the sky, and, after exposing for this, to keep it waggling thereabouts whilst the rest of the view is getting done, a decently firm stand being, of course, understood. A further refinement may sometimes be indulged in. Along the lower edge of my flap is a piece of thin watch-spring, under which a slip of black paper can be pushed, and the edge torn until it nearly follows the line of sky. No great nicety is required when using this dodge. And in architecture, particularly in confined situations, it will often happen that the lower part of a building is much less perfectly lighted than the upper part. I do not now refer to distinct cast shadows, although here also the flap will be found useful, but to the way in which, for example, houses

opposite may cut off much of the light from the sky. Here the flap may give, say, three or four seconds to the top of the building, and allowed to descend slowly, giving double that exposure to the bottom, more or less, according to circumstances. Not the least fear need be entertained that a distinct line will show in the negative, even though a slight pause may be involuntarily made in the movement, the edge being so near the lens as to be completely out of focus even with the smallest stop generally used.

NATURAL CLOUDS IN NEGATIVES, &c.

By George A. Carruthers.

That popular fallacy which used to find so much credence with the uninitiated that a camera lens was about one of the most truthful articles outside the precincts of a Sunday school has, with the advent of photography as an amusement, become almost exploded; the veriest tyro who has developed a quarter-plate is painfully alive to the wide difference there is between nature and his counterfeit presentment of her by the aid of a silver print. Orthochromatic plates, to an extent, give us better colour values, but they still leave much to be desired. The plate has yet to be invented that will yield us a truthful, or even natural rendering of certain subjects: as an example taken at haphazard, say a waterfall in juxtaposition to heavy foliage. Whilst we are trying to get out detail in the latter, the pyro has made the former so dense, that no masking—mask we never so wisely—will ever give us the picture anything like as we saw it, and, as for the sky, it will have shared the fate of the water, and be as dense and as black as our best Sunday hat. For the information of those who pursue other than a merely tentative method of development, who use their chemicals mixed with a plentiful supply of brains, and instead of adopting the happy-go-lucky method so much in vogue with amateurs nowadays—one solution men, *et hoc genus omnes*—endeavour, by an expenditure of time and trouble, to produce a negative as near perfection as possible, the following hints may not be thrown away.

One of the greatest attractions to a landscape picture is undoubtedly a suitable sky, as witness how often it is the sky makes it a picture; and nothing can be more inartistic than those large blank spaces—called sky from courtesy—we are all so familiar with; it may be, and is argued by some that they are necessary in views of a certain class—that if the clouds were not there they should not be shown; but this is obviously an error. If the clouds are absent, there is always colour, more or less graduated from horizon to zenith, which does duty for them, but in the white patches spoken of there is rarely a vestige of tint. Bought cloud negatives do much to obviate the difficulty, but a very large number, costing much money, are required, unless satisfied to use the one or two most of us possess indiscriminately for everything. It is, therefore, an immense advantage, when we have the means placed in our power, to preserve the clouds in our negatives as they actually were at the moment of exposure; to do so it is only necessary to proceed as follows:—To a wide-mouthed eight-ounce bottle of water add one ounce bromide of potassium, less proportionately, of course, if desired. Commence development with a

solution weak in alkali, or, if the solutions are kept in stock, ready mixed of a given strength, as is frequently the case when sodas are used, restrain well with bromide, the object being to keep the whole operation well under control. In a short time the sky and high lights will make themselves observable; now is our chance—with a soft sable brush, larger or smaller, according to the nature of the work in hand, paint all over the sky with the stock bromide solution, carefully dodging round the edge of the landscape, and holding the dish so that the bromide will not run over it, the developer being held to one side, or, better still, poured to and from the gradient during the operation; of course, it must be allowed to flow over the sky as much as required—a little practice will soon determine how much—until the latter has acquired the proper printing density; the bromide it removes will only restrain development, but do no harm. If these operations have been properly carried out, and nothing is easier than to do so, the negative, when fixed, will be found possessed of a sky in balance, lighting, and harmony, with the rest of the picture, which is more than sometimes can be said when bought ones have been used.

It may be considered almost supererogatory to remark, *en passant*, that no amount of development will bring out the clouds if they were not included in our angle of view; it is well, therefore, to make a note, mental or otherwise, of the fact of their presence or absence at the time of exposure, also the nature of the clouds themselves, as it would be obviously futile to endeavour to preserve the forms of, say, some of the Cirri with only the blue of the firmament as a background—a colour almost as actinic as themselves.

Much of the blurring around trees and other dark objects taken against the light may also be avoided by applying the bromide as the evil makes its appearance, but it is in the development of interiors that its use is especially efficacious as a counteractant for halation. The efficacy of the following treatment of such subjects having been proved, its trial can be recommended. Expose for the deepest shadows, and as by doing so it will be known that the remainder of the plate has been much overtimed, commence operations as for the clouds with a minimum of alkali, and around the windows, which almost instantly appear; thoroughly paint all traces of halation with bromide solution, using a small sable brush—No. 5 is a useful size for half-plates—then when detail is all out, rinse the plate; then with another brush paint over the shadows, using this time a very strong solution of alkali and pyro, which will start into life a surpassing amount of detail; the plate may then be fixed as usual, when the difference between it and one treated in the ordinary manner will be so apparent that the operator will probably remember the discoverer of bromide in his orisons for a considerable time to come.

'PINS AND NEEDLES.'

By Rev. F. C. Lambert, M.A. (Camb.).

Who has not experienced this sensation after having spent a couple of hours sitting on guard by one's camera in some dark interior? or experienced a somewhat similar sensation when the last plate has just been

fired off at some choice bit, and the moment after it has flashed across one's mind that that plate had already been exposed on some other equally choice bit? or as development flashes out, and you just recall the suspicion that you have added a double dose of alkali instead of restrainer to a much over-exposed plate?

Most of us have had 'pins and needles' at some such time, and though 'sweet are the uses of adversity,' yet one does not care to go in for such 'sweets' immoderately. However, there still remains at least another way in which pins and needles lose their terror and become friendly companions. We hear much about uses (and abuses) of swing backs, and are not unfamiliar with 'drunken architecture,' and though our friends in need have kindly tried to help us with circular, T-square, and other levels, some of which I have tried and found * * * [printer, put three stars here], I find a very simple device, which I added to the swing back of my camera, enables me to get the swing back both horizontal and vertical with ease and certainty.

An ordinary rather stout steel knitting needle is softened at one end in the fire or gas flame, and with a pair of nippers turned, while still red hot, into a loop (A), and cooled by plunging into cold water. A couple of stout pins, with their heads cut off, are bent into a ⌐¬ shape, one of which (B), placed vertically at the side of the swing back, suspends the knitting needle to swing freely. The other (C), placed horizontal near the lower end of the swinging needle, limits the play of swing. The swing back is carefully set vertical, and the position of the needle when at rest is marked by the point (D). A suitable marker is obtained by cutting off the head end of a small pin, a quarter of an inch from the head, and driving into the wood flush with its surface.

A similar arrangement on the ground-glass (E F) side of the back gives us the required horizontal indicator.

As several friends have seen and approved of my 'pins and needles,' I think others may care to try the plan. The cost of the experiment is about one penny.

AMATEURS' NEGATIVES AND RETOUCHING.

By Redmond Barrett.

Good retouching is always an important factor in the production of good marketable photography; and much as this applies to the professional photographer, it is of still more vital importance to the amateur, who aspires to produce really good work. The retoucher, or as many professional photographers contemptuously designate him, the 'pencil pusher' (without whose help, by the way, they cannot get along), has much to contend with, but let him always remember that the motive power which *pushes* his pencil should be *brains*, and his work will never fail to command due appreciation.

As a rule, the negatives taken by a skilled operator, in a well-con-

structed and lighted studio, should be easily retouched—that is, by any one worthy of the name of retoucher. The more or less skillful the operator may be, the more or less trouble the retoucher will have in his endeavours to produce a satisfactory result. The knowledge once acquired, as to how *one* head should be retouched, will infer a certain command over *all* negatives taken under similar conditions. By similar conditions I wish to be understood a studio picture taken by a skilled operator. In such work there is, as a rule, uniformity of effect, and general similarity of conditions, seldom calling into play the best qualities of a thoroughly skilled and artistic retoucher. The truth of what I say will be more easily seen if the reader will examine the works of any of our leading photographers; the same characteristics will pervade each one's negatives throughout. Indeed, I have known cases where certain skilled operators' negatives bore as much individuality—and could accordingly be recognised one from the other—as do the works of some of our best artists.

Now, all this is very well as regards the professional in his studio, but does not at all truthfully represent the conditions of the amateur's negatives. I have known amateurs who are second to no photographer that I can think of in ability, knowledge, and artistic feeling, but such cases are rare, and to such my few remarks cannot refer. There are, I may say, thousands of other amateurs who flatter themselves they can take a photograph, and wonder why it is that, as regards portraiture, they must take a seat so very far behind the professional photographer. I can, perhaps, tell them. They do not have their negatives properly retouched. The ever-varying conditions under which they work must necessarily influence the quality of their negatives, and in retouching them it is more a question of *thought* and skill than actual labour which is required to make them produce really satisfactory photographs.

A retoucher will have sometimes very thin negatives, with the slightest possible indication of the features, which will require very judicious help to make them print anything presentable, and at other times he will have the most violent contrasts between light and shade, which will tax him to the utmost to harmonise and soften. The advice, therefore, is, when amateurs want their negatives retouched let them be careful in the selection of the retouchers into whose hands they entrust them. There are lots of most capable artists about, but see you select one of them, and so have justice done to your work. There are few things more easily spoiled than a negative, and an amateur's negative the easiest of all.

RAPID EXPOSURES.

By John Harmer.

Judging from the work which comes into my hands from all quarters, it appears to me that there is a vast deal too much hurry in making the exposure, the consequence being that the sharpness is positively painful, while the other qualities of the negative are those due to under exposure, and therefore require no further description. In most cases the period might have been considerably prolonged without the motion of objects becoming apparent sufficiently to detract from the more harmonious

rendering of the subject the extra time would have produced. It may be necessary to operate the exposer in an infinitesimally small interval for scientific purposes, but there is no such need when fine art is in question with its main idea of making a picture, then a full exposure is required, and the cardinal rule should be to get as long a one as possible, even when motion or probable motion has to be taken into consideration. From the imperfection of all shutters in respect of giving a complete command over small intervals of time and terminable at the will of the operator, one is bound to set them to a safe speed in case there should be movement, whereas were there means of terminating the exposure at a shorter period than that for which they were set, there would be greater freedom and better negatives. If the principles governing the cap and hand exposure, which was all very well when minutes were in question, could be successfully applied to shutters dealing with fractions of seconds, and enable the operator to escape from the control of the shutter spring, the acme of perfection would be attained. To illustrate what I mean we will suppose that a detective camera is being used on a street group. The operator calculates the exposure and sets the shutter under the fear that one or other of the party may move, and therefore makes it as short as possible, afterwards to find that all remained quiet for two or three seconds, good behaviour entirely lost upon him simply because a steel spring or indiarubber band had made him run second. All the thousand-and-one exposers of the rapid class on the market have this fault. What we require is, as complete control over the exposure when the time is measured by fractions of seconds as we had with the cap when we were dealing with minutes. Inventors, please note.

STRIPPING FILMS.

By A. A. Carnell.

I have now been working these films for over twelve months, and having encountered and, I am glad to say, mastered, I think, every difficulty likely to occur with them, am only too glad to give my experiences to those who are in doubt or trouble about strippers.

My first attempts were most discouraging, but now I am so satisfied with the uniformly good results I get that I have entirely discarded glass plates. At the risk of being rather lengthy, I will give my experiences in the form of 'What *not* to do,' as the concise instructions issued by the Eastman Company quite fully set forth 'What *should* be done.'

Those who are *au fait* at the process can, of course, pass my remarks lightly by, but I never came across any process in which I was so glad of the most simple hints as in working strippers.

When the packet of films is first opened, if there is any doubt as to which is the sensitive side, merely breathe upon it and the silver surface will curl inwards; do not try it with the tip of the finger moistened, as, although that will at once tell you, it is likely to cause trouble by the film sticking to the carrier. Of course I am speaking now of cut sheets; with a spool there is no difficulty.

On proceeding to develop, it is important to *immerse* the film in a dish of water. If placed in a dry dish, and water is poured on it, the back

will probably not be wetted, and wofully uneven development be the result. Let the soaking be very thorough.

Do not on any account give too short exposures (the latitude is very great, and you can do almost what you like with these films in developing), rather err on the side of overdoing it.

When development is carried far enough transfer the film to a dish of plain cold water, and when the batch is finished let them soak for half an hour before fixing. This plan removes a large amount of discoloration.

Do not be tempted into using rubber in benzole. The glasses must be thoroughly cleaned any way, and it is far less trouble, much cleaner, and equally efficacious to use plain French chalk, as in enamelling; the film will be found to leave the glass with greater ease, and a far better surface than if the messy rubber is used.

The coated plate must not be immersed in water until thoroughly set, or part of the collodion will precipitate on the glass and entirely prevent the stripping operation.

Collodion should be made at home. Four grains to the ounce of Hopkin and Williams' ordinary pyroxyline, in equal parts of methylated ether and alcohol of sp. gr. ·720 and ·818 respectively, will answer just as well as the more expensive articles sold for the purpose.

Being much engaged during the day, I always develop at night, and defer the stripping until morning; but if the films are left soaking in plain water only, the chances are that the edges may frill badly, owing no doubt to the action of the developer upon the soluble substance. To prevent this I add to the last washing water a small quantity of acetic acid—say, one drachm to sixty ounces of water; be careful that it is no stronger, or the films will frill entirely off the paper. If the acid is used the stripping is a matter of the greatest simplicity, merely tepid water will float them clean off without assistance.

When the paper backing is removed give the film a good washing with a broad camel's-hair brush, but do not apply the stripping skin until the plate has been thoroughly cooled under the tap. If the skin is put on too soon—*i.e.*, while the plate is warm—it will contract so much that quite a quarter of an inch all round will be wasted. (I am speaking now of a whole-plate.)

If I should have time to strip them the same night, when finished, I requisition the kitchen mantelpiece, and if reared on end they are quite fit to collodionise the first thing in the morning; but if they are not stripped *until* morning I do *not* use the mantelpiece, as the heat that is caused by the performance of culinary operations will make them dry most unevenly, and cause much trouble; nothing but gradual drying will do.

Let the drying be most thorough before the final application of the collodion. This may be ascertained by rubbing the film smartly with the hand. If a rustling noise, as when silk is rubbed, be the result, it is quite ready. After detaching from the glass place the film between the leaves of a book; this prevents the tendency to curl up.

These films must not be printed in sunlight, at any rate until some days old, for if they get at all heated, and the frame is opened to examine the progress of the printing, it will be found that the paper will not again register properly; the negatives are so very clear that diffused daylight is almost always sufficient.

Should there be any little defects to be touched out, use a soft black-lead pencil before collodionising for the last time, the matt surface of the stripping skin offering a splendid surface to work upon.

If the films are kept in the carriers long before use there is a great tendency for the paper to stick to the film in the hot-water bath, especially at the edges, where it has been pressed against the carrier. In this case the acid bath recommended above comes in most useful. Be very careful never to *pull* the paper off; let it come easily. If pulled, the film will most likely leave the glass altogether, and be spoilt.

Of course with roll holders this last-mentioned difficulty (that of sticking at the edges) will not occur, and I must say they are the greatest possible luxury when on a tour. At the same time, when it is desired to expose only one or two films it is better to use the cut sheets, as the waste in cutting off a single exposure and replacing the spool is rather great.

It is wonderful what a large amount of light may be used in developing. One thickness of oiled canary medium with a paraffin lamp is quite sufficient, and yet I find that strippers are just as rapid as most glass plates.

When using a roll holder away from home it is wise to mark off each day's work by withdrawing the shutter and marking each end with a black-lead pencil. No lantern is necessary. The darkness of one's bedroom is quite safe, and one can easily feel to perform this simple operation. It is of the greatest assistance when cutting exposures off the spool.

In conclusion, I can confidently recommend those who have not tried strippers to give them a trial, as I am certain that when once they get into the working of them they will not return to glass plates. The advantages of the films are so great—viz., lightness, freedom from halation, and ease in development, besides the delightful convenience of being able to carry from forty-eight to a hundred (with the Kodak) films in one roller-slide.

A CHEAP AND EFFECTIVE METHOD OF DARKENING A ROOM.

By Francis T. Beeson.

In London and other large towns where space is valuable the photographer will find it useful to have a room which he can render dark or light at will. This is not an easy thing to do. I have a vivid recollection of my first attempt. The room was at the top of the house, and it was a brilliant spring day. After tacking brown paper up to the window, I found light coming in round the edges; this I remedied by laying hands on all the old shawls, coats, or anything I could find available, and hanging them round the window. Then I found the door required a similar attention; and when I thought I had all secure, there was a strong beam of light coming down the chimney.

The following is the method I have now adopted, and I find it answer very well. For each window in the room proceed as follows:—Procure an ordinary blind roller fitted with cord, rack, and pulley, or other means of drawing up and down, and fit the roller at the top of the window. For the remaining three sides of the window frame cut some strips of 'carpet' or other strong brown paper about six or eight inches wide, crease these

down the centre lengthwise, and glue together with thin glue. While the glue is still moist fold the strips again down the centre, and put on one side to dry. These will form grooves one and a half or two inches in width, and should be tacked on the two sides and the bottom of the window frame, open side inwards.

The blind is made of one thickness of black calico or linen and one thickness of carpet paper, tacked on the roller in the usual way. The material I used was Laws' 'black enamel fabric.'

The blind is made just wide enough to work in the paper grooves which have been fixed round the window. A close-fitting valance of black material is fixed up over the roller, and the arrangement is complete.

Where it is considered desirable, the whole or part of the blind might consist of some translucent red or yellow fabric.

ABOUT RETOUCHING PORTRAIT NEGATIVES.

By W. M. Ashman.

Last year my contribution to the pages of The British Journal Photographic Almanac had reference to certain desirable conditions in a retouching medium; during the interval my opinion has remained unchanged.

Upon this occasion I purpose dealing further with retouching, and wish to mention one or two points of importance which may help the tyro towards attaining a better style of touch on portrait negatives than he may at present be able to secure.

Starting, then, with the assumption that a negative of a given subject has been already treated either with a retouching medium as directed in my communication previously alluded to, or that the varnish over the parts to be worked upon have been rubbed with powdered gum resin until a matt surface has been obtained, the beginner should endeavour to train the hand to make very light touches of the pencil upon this specially prepared surface. These markings may take the form of a line or dot; the former facilitates the work as regards speed of finishing; the latter, although less rapid, can be more easily acquired, and as the object of this short article is to assist those seeking for information rather than to enter upon a criticism of established systems, we will consider the stippling or dot method only.

In other places the writer has dealt somewhat exhaustively with the details of arrangement suited to the requirements of the retoucher, so need not enter into that part of the subject now, it being sufficient to remark that in order to obtain a light touch, pencils having sharp points must be used; and that a negative of an object when looked through is the reverse in light and shade of what the eye would translate, minus also the colour.

In nature, shadows or half tones are never so pronounced as they appear in a technically good negative, and the main object of retouching, as it is termed, is to so modify the harshness of those portions, which produce shadows when printed, that the finished result may appear to be a more truthful transcript of nature than would otherwise be the case. Modification by retouching must therefore be admitted as a useful adjunct

to the reproductive art of photography. Now, bearing these facts in mind, it becomes obvious that every pencil mark placed upon the clear portion of a negative renders the particular part, or parts, worked upon less vigorous, and, consequently, when printed from, the result shows a greater degree of harmony. In practice we soften in this way all shadows which to the experienced eye appear to require it, for in portrait photography no method of lighting has yet been discovered which renders retouching superfluous.

It will be found more simple if the tyro starts his or her practice upon the deepest shadows in a portrait negative first, and, with the lightest touches the manipulator is capable of, to make a series of dots thereon, until the whole, of what may for simplicity sake be called a patch, has been covered uniformly. Then, if carefully done, it will be noticed that there is less contrast between this shadow and the adjacent light or opaque portion. This method of treatment may then be continued over other shadows of less intensity until a certain amount of smoothness has been gained, which to the uninitiated may be somewhat startling. At this point the negative had better be printed, and the result examined. If the print is wanted in vigour the touch has been too heavy, or the shadows may have been completely blocked with pencil so as to render the printing power of the shadows equal to that of the lights, and hence the failure. But if the contrary is the case, the shadows are too heavily marked, their further modification may with impunity be resorted to. It is better to avoid placing the dots very close together, as there is a tendency by so doing to produce a patchy effect instead of the more regular stipple desired. The principal shadows which require attention are those adjacent to the leading facial muscles, and are, as a rule, so clearly indicated in a negative as to demand no further identification. Lastly, no shadows ought to be obliterated unless by special desire, and in a properly exposed negative remember that the opaque portions can take care of themselves.

ON PRINTING.

By the Rev. J. Carter Browne, D.D.

Owing to pressure of work, and subsequent absence from home, my contribution to the Almanac must perforce be short. I should like to have entered into a discursus upon home sensitised and ready sensitised papers, but can only say a few words regarding the latter and the simple method of procedure. On account of daily duties many, if not the greater number of amateur photographers, are compelled to use bought sensitised silver printing paper. In this line there are papers and papers, some of them printing and toning very readily, others with persistent slowness. The cause of this latter is chiefly due to an admixture of acid which is incorporated with the sensitising salt in order to make the paper keep. No paper in a decidedly acid condition will tone except after a long time, and then only when an elimination of the free acid has taken place. Therefore, one of the first *desiderata* is to get rid of this acid. Many workers use bicarbonate of soda; let them for the future try the plain carbonate commonly known as washing soda in the third water before toning, and a manifest improvement in temper and tone will be the result. Another

piece of advice is never to use bicarbonate of soda in the toning bath, as sometimes recommended. It kills the gold, and however much of the latter salt is used, barely a trace will remain when next the bath is required. I use a mixture of acetate of soda and borax, and find a far more pleasing result in the final tone of my prints. Indeed, with this bath I never fail to get any tone desired, from a rich brown to a deep purple. Tungstate is useful in its turn, but with the above ingredients we have a useful bath, which leaves little to be desired by those who still adhere to silver printing.

ZOÖPHOTOGRAPHY.

By Lewis Medland.

Almost all mankind have a fondness for animals. Some have their favourite horse, while others possess a faithful dog, and not a few (especially elderly maidens and lodging-house keepers) a familiar cat. Many who have travelled in countries where wild animals roam at their own sweet will, continue to take an interest in specimens of the same in captivity, especially where ample space is given to them, and their surroundings are clean and comfortable; such being the case in the gardens of the Zoological Society of London. Having spent some years in the Cape Colony, besides travelling in an ox-waggon through the length and breadth of Natal, the Transvaal, and the Orange Free State, I naturally became acquainted with the majority of the animals whose home is in South Africa, including many rare species not to be seen in the 'Gardens.' Anxious, therefore, to make studies by the aid of photography, I applied to a Fellow of the Society, who probably vouched for my respectability and the cut of my coat, so I was quickly furnished with an admittance card, which entitled me to visit the Gardens for three months from 9 a.m. to 3 p.m. with photographic apparatus every day in the week, Saturdays and Sundays excepted. At the expiration of that term a renewal of the card is usually granted by the courteous Secretary.

For two seasons (generally from May to October) I took a half-plate camera and tripod, with varied success, my pictures being mostly 'pitied' on account of the ever-present 'bars.' This year, having a hand camera by Newman containing a changing box for twelve plates, and a supplementary box for twelve more in a small satchel, a shutter working through my 5 × 4 Wray's doublet, a speed adjuster, view finder, and the focus marked in yards, I have been able, during the month of September, to do a great deal of work, the objectionable bars being absent in almost every case. With this camera I can take a quarter-plate picture sharp to the edge, with full opening, at even three feet from an object. Of course, with an ordinary camera much of this would have been impossible. In my experience the only principal parts where bars are unavoidable are the lion house and the hyæna and bear dens. The former is fairly lighted in the afternoon, the latter seldom. One requires an extraordinary amount of patience, especially as the majority of the animals are so tame that in placing your camera against the enclosure, the average distance between your lens and the animal's nose is generally from two to three inches. To somewhat overcome this difficulty you must have a supply of biscuits and apples, and be able to

throw them with fair accuracy the distance you have moved your focussing lever to. Some absolutely refuse to budge an inch, notably 'Jack,' the gnu, who in dry weather is either kicking up a fearful dust or battering the barrier in the vicinity of your lens with his horns.

Monday—or as it might justly be called 'Bunday'—is not a satisfactory day for photography, on account of the extra attendance and consequent feeding. Friday up to twelve o'clock should be avoided on account of the hundreds of school children, who literally surround you. I should suggest Wednesday or Thursday to be the best day to get the bears up the pole; for I have known the keeper on Tuesday to try in vain to get them up, even by means of a tempting morsel of meat. A story crops up now and then that once upon a time a certain attendant was told by the refreshment contractor to take a barrow-load of buns to the bear pit, meaning the adjoining refreshment stall. The man, who was an Irishman, took it literally, and in consequence the bears had an extra liberal feast. I believe something of the kind did occur in the time of a past contractor; but the story being such a good advertisement, it continues to play its part at suitable intervals.

The lions and tigers in their outdoor enclosures are excellent studies; and it is here where the hand camera comes to the fore, for you are enabled to rest it on the stonework, but in this case it is advisable to keep your eye on your subject and not the view finder, or perhaps you may have to pick up the fragments. I remember on one occasion, when I used my half-plate without the tripod, I was busy focussing under the cloth; all at once I saw the abnormally large head of the lion 'Punch' on my ground glass; I only drew the camera back just in time, for the king of beasts meant business by the way his paw crashed down where my lens had been the moment before. I have before me a picture of a lion taken without any signs of bars, even at the back; his position is in front of some artificial rockwork, five feet from the lens. Occasions like this rarely occur, for the sun, as a rule, shines exactly in front of your lens where 'barless' pictures might otherwise be taken. The elephants, 'Jung Perchad' and 'Suffa Culli,' who bid fair to rival the late lamented 'Jumbo' in stature, make good studies, and can be taken without their usual loads near the elephant house about 1.50 p.m., after which they commence their daily peregrinations on the other side of the tunnel. The lesser elephants, 'Jingo' and 'Solomon,' do not fill the plate quite so much as their aforenamed gigantic brethren. Those who carry camera bags had better beware of the ubiquitous trunks of these animals; for on one occasion, whilst talking to a friend, a sudden jerk made me turn round, and I found 'Jung Perchad' with one of my dark slides partially out of its receptacle. The rhinoceros is generally 'too near or otherwise too far' off. Any length of exposure can be given to the hippopotamus; even two seconds, if you require an interior view of his capacious mouth. The giraffes are either sunning themselves close to the wall, or their heads are over the top of the railings, where on exposing a plate it would have to be continued in our 'neckst.' The zebras take well, and apparently the negative is a positive and *vice versâ.* 'Sally,' that intelligent specimen of the bald chimpanzee, cannot be taken without 'wires;' besides which she strongly objects to having her portrait taken, especially since a 'flash light' was tried upon her. 'Jennie,' the younger, sits well, also 'Pollie,' the new ourang-outang both can be taken in the

keeper's arms or on a chair. The light is never very good in this building. Just outside are the kangaroos; and recently a most interesting study could have been made of a baby Wallaby in and out of its mother's pouch. It is almost useless to visit the monkey house, because of the close wire netting and the great curiosity attending your operations. A small looking-glass is here handy to divert their attention from your lens. In the reptile house the alligators alone can be taken, and any amount of exposure can be given if you can hold your camera steady upside down. The reflections on the glass fronts prevents satisfactory pictures of the snakes. The elands, zebras, buffaloes, bisons, gazelles, *cum multis aliis*, can be secured with moderate patience.

I must now draw my sketch to a close, incomplete as it naturally is, with so much 'food for the plate;' for I must not forget the few individuals who do not take the slightest interest in animals, and cannot see any difference between the winner of the Derby and a costermonger's 'moke,' or a noble St. Bernard and the sneaking half-starved cur which purloins a choice 'block ornament' from a butcher's stall.

A last word to my photographic friends—Treat the keepers as human beings, and not as pieces of machinery. If you promise a print, keep that promise. I regret to say I know of one or two who for years past have on each visit promised prints, which the keepers have helped them to obtain, yet those promises are of the pie-crust order. We photographers are somewhat in the hands of the keepers, who can help or prevent us at will. A keeper values a good print far more than 'palm oil;' and I can say, without fear of contradiction, that at this moment some hundreds of mine are in their possession. Hence my will is almost law to them, for if any difficulty as regards the position of an animal arises, that difficulty is removed if it is in their power.

LABELLING BOTTLES.

By C. C. Vevers.

Those whose dark rooms or chemical cupboards are situated in places having a tendency to dampness (and this is generally the case) will have experienced the annoyance caused by the paper labels becoming detached from their respective bottles and the subsequent doubt arising as to their contents. Most undoubtedly the best plan is to etch or engrave the name of the chemical or solution direct on to the bottle, but the writing fluid for this purpose is dangerous to prepare and use, and so difficult to store, that few there are who care to employ it. Yet for those few I append the formulæ of a mixture that has been found very efficient:—

Barium sulphate	3 ounces.
Ammonium flouride	1 ounce.

to which add sufficient sulphuric acid to decompose the ammonium flouride and make the mixture semi-fluid. The ink must be prepared in a leaden dish and kept in a lead or gutta-percha bottle. It is applied to the glass with a camel's-hair brush or quill pen, and when sufficiently etched the granulated letters should be filled in with some white or black pigment.

The sand-blast and other mechanical engraving methods are altogether out of the question for any but professional glass cutters. Nor can the letters be cut very satisfactorily and legibly with a diamond. We have, then, nothing left but paper labels, and as an adhesive preparation for such experiment has shown the following formula to be about the best:—

Gum arabic	1 ounce.
Gum Tragacarth (pulv.)	1 ounce.
Acetic acid	40 minims.
Glycerine	1 ounce.
Water	2 ounces.

Dissolve the gums in the water, hot; then add the acid and glycerine.

The next difficulty as regards paper labels is the fugitive qualities of ordinary writing ink. A bottle labelled 'Nitric Acid' with a good bold black ink, may, in a few hours, bear nothing but a label with a few yellow stains upon it to denote its contents.

The following, then, will be found to be a good non-corrosive ink and as near indestructible as writing fluids can be made:—

Oil of lavender	1 ounce.
Powdered copal	1 drachm.
Lampblack	6 grains.
Indigo	2 ,,

Dissolve the copal in the oil by gently heating, then add the lampblack and indigo.

To make 'assurance doubly sure,' after the label has been written with the above ink and attached to the bottle with the aforementioned adhesive mixture, coat both label and upon the glass surrounding it two or three times with the following varnish, by means of a camel's-hair brush, first sizing the label with a solution of isinglass in water:—

Canada balsam	1 ounce.
Spirits of turpentine	2 ounces.

and that label will stick like a doorsman to a possible sitter, while the writing will be as ineffacable as metal marks on a silver print.

RED-LETTER AXIOMS, PHOTOGRAPHIC.

By W. Clement Williams.

Be methodical and precise in all you do; remember it is system and attention to details that ensure success. Be cool and collected when in the field or laboratory; do not allow your thoughts and attention to be divided when at work; trust nothing to memory, but make notes of everything necessary to be kept in mind 'there and then.'

The non-observance of these rules has proved to be the cause of many a plate being lost, in both development, exposure, and storing away. Two pictures at times appear most vexatiously on one plate, and always the best subjects; both spoilt, of course. Cameras are shaken, or become unsteady, just when they are wanted to be still. Shutters are so anxious to prove their speed that they pop off at the wrong time, 'most inconvenient.' The dark slide gets pulled bodily out of its place in the camera when it is only intended to remove one of the sliding

doors, or the wrong door receives attention, or no door at all gets pulled out, and the lens wastes its fragrance, or functions, on the desert of polished mahogany. The cap of the lens is found off, and in your pocket, when it ought to have been on the lens. The dark cloth flies off, or the camera tumbles over in the wind; and amongst this medley of doing those things we ought not to do, and leaving undone those things we ought to do, we pull ourselves up, stuck fast in muddledum, as to whether 'we exposed the plate or not' when we removed the cap and so carefully timed the seconds. The panacea for all these ills is, I would once more repeat with emphasis, be methodical and attentive to little details, for the big ones are made up of littles.

Do not be satisfied with common-places in your work; let your standard of perfection be a high one; if you do not always reach the goal, still persevere, and excellence of results will eventually crown your efforts. But to discriminate intelligently, to be able to separate the wheat from the chaff, to know and understand a good thing when you see it, and, above all, to know the why and wherefore of its goodness, implies an educated and refined taste, a keenness of perception only to be attained by painstaking seeking.

I believe that the achievements of many who, ever and anon, do what nobody else has, or can do, is to be attributed to a lack of this artistic perception, and being easily satisfied, speak highly of results by methods and processes that won't bear examining, and only prove misleading; therefore aim high, and having ascertained the right track keep to it.

The tendency of the times is to abbreviate everything; it is called, I think, simplifying, or the science of taking short cuts. Be careful how you deviate from the well-ascertained path of photographic practice, or you may find yourself like the man who left the beaten track to spring over a wall, rolling in an undignified manner down a precipice. When he arrived at the bottom of the bottomest hole, a sadder and wiser man, he went back and started again. Take timely warning.

We hear a great deal now and then, especially among amateurs, or 'shamateurs,' as we have been lately dubbed, as to the best size camera and kind to adopt for outdoor work. Now, there are a few 'ifs' and 'buts' to be reconciled, or disposed of, before this 'little detail' is settled. I have, during a photographic experience of not far short of a quarter of a century, used a quarter-plate, 5 × 4, half-plate, whole-plate, 10 × 8, 12 × 10, 15 × 12, and lastly, 20 × 16, and I would say, 'if' you want large pictures, possessing artistic merit, fineness of detail, atmosphere, a good scale, or gradation of half-tone high lights without hardness, there is only one way of getting them—use a large camera and take them direct. I have no hesitation in saying, no enlargement from a small negative can, in the hands of ordinary mortals, equal a direct picture. I have used a well-appointed enlarging camera for a dozen years, or more, and a most vexatious and expensive hobby it has been. I know I am critical of results, but it is here that the 'ifs' and the 'buts' come in. I know also that enlargements *can* be produced from small negatives, 'but' they are what they are, would be better 'if' they were not so hard and flat, and the other 'ifs' and 'buts' were absent.

If one, however, *must* carry a smaller camera with a view to after enlargements, select one 10 × 8 as the minimum size; remember, in crowding in the same amount of fine detail on a 5 × 4 plate that you

would on a 10×8 you only have a quarter the area to deal with, and the danger arises of blocking up the finer detail (and consequent hardening of the subject when magnified) during the operation of development, and you may, therefore, take it for granted that the percentage of small negatives at all suitable for making even an 'if' or a 'but,' would be found in practice to be far from encouraging. It must not, from the foregoing, be thought I condemn small pictures. These have their uses and recommendations, and there are times, places, and circumstances when such, and no other, can or ought to be taken. But, on the other hand, it is a great mistake to suppose they can be made to satisfactorily form the germ of larger works possessing the higher qualities of direct pictures; one of the first elements or considerations in picture making precludes this result, even if the purely technical details had been overcome. It must be remembered that in the case of small work, almost anything possessing a good balance of light and shade will make a picture, but in a large composition would be a lamentable failure. To fill a large plate satisfactorily with real picture-matter requires much thought and discrimination, which goes by the names, 'artistic taste and skill.' Only those who have made the attempt can fully realise the fact that photographic picture making can be elevated to the dignified pinnacle of a fine art. Let the painter who denies the fact drop his brushes, and take up a camera for a short time, when he will easily discover how little of mere mechanical force enters into the productions he so begrudgingly acknowledges as art at all.

From this point of view I would advise all who would attain a high artistic education as photographic picture makers to use as large cameras as possible, for by the very difficulties to be overcome a man gains the knowledge that makes the artist.

With small plates there are great temptations to get through 'quantity,' to the neglect of quality. How often have I heard it said in the field, 'I'll venture just one plate on this, anyhow—they're cheap enough, and I have a dozen plates to go at;' and at the end of the day too often may be added a dozen 'ifs' and 'buts' as the record. But, on the other hand, the extra weight of large plates, and the difficulty of obtaining subjects, limits, per force, the number, and the consideration of cost forbids hasty action.

I would now say a few words about the camera. Do not go in for flimsy lightness; firmness and solidity should be the first consideration —a little weight is really an advantage than otherwise; a parallel bellows is the best—the conical, or Kinnear, form had its day many years ago, and still went out of favour, and will again. The taper is of no use with short-focus lenses, because the bellows intercepts the rays of the picture passing from the lens to the plate, and consequently part of the latter remains uncovered by subject, and clear glass results on development. This happens at times most inconveniently, even when long-focus lenses are used. Go in for a double swing back, horizontal and vertical. I know there are men of unimpeachable artistic knowledge who say the side swing should be avoided, as bringing into focus too sharply subject-matter that should, by all canons of art, retire, and possess the indistinctness of distance. With this artistic objection I entirely agree; but there are times when this objection becomes untenable. I well remember an experience at the seaside. A fishing fleet

was the subject of my 'cameraic' attentions, the boats filling the whole length of the plate, but, although massed together, still receded slightly into the picture, but not sufficiently to emphasise or assist the perspective, but just enough to make the rigging of the vessels appear out of focus on two-thirds of the plate—and there is nothing so unsatisfactory, perhaps, as blurred lines that should be sharp and clear. In this case the side swing would have been quite legitimate, for stopping down the lens did not remedy the evil, and even if it did, I would have preferred the former to the latter remedy. The old saying, 'There is a time and place for everything,' should be borne in mind, and while I say a side swing should be used with caution, I consider no camera perfect without one. A rising and falling front is necessary, though not a side motion; but a swinging or sidling front is sheer nonsense, its only function being to throw the rays from the lens away from the plate. In the case of a swing back, the plate remains at whatever angle it is placed, fully within the covering field of the lens, but to tip the lens with a swing front is to remove the covering field, just as the circle of light from a bull's-eye lantern may be swung in any direction. Opticians do their best to give us this covering power in their lenses, therefore do not let the eccentricities of the camera makers rob us of it by any such fanciful 'fakements' as swing fronts. For small cameras it really does not matter which portion, the front or back, travels for focussing, though perhaps the front should have the preference; but for large cameras, of long focus, I prefer the front to slide forward, to be simply drawn out and clamped by hand at a fixed point, denoting the rough focus of the lens in use, and the exact or final focussing to be attained by a short length of screw at the back. The back should never travel far forward, or the tailboard may prove to be in the way. For the focussing screen I use the finest quality of engineer's tracing cloth, and have done so for several years, used as a blind to roll up out of the way. Necessity is the mother of invention, it is said. I once broke a large focussing screen of ground glass, and not being able to replace it immediately, I turned to this tracing cloth, a material in daily use by me in connection with my profession; finding it answer well, I adopted it to my larger cameras, as obviating the danger of breakage, and being a saving in weight. For small camera work, however, these reasons do not apply, and I still use the ground glass.

For packing the apparatus, have a wooden box to hold everything, except the camera stand, for long journey travelling; but for the field, a mackintosh cloth case for the dark slides, with a couple of straps round, fastened by loops, will keep these in solid form.

A good-sized velvet focussing cloth and strap for camera is all that is necessary, but a mackintosh case to cover over all, folded and carried in the pocket when not in use, may be added. Don't go in for weighty, stiff, leather cases; they are not requisite. What photographer is there that does not guard his camera and slides as he would the apple of his eye when out for a day? Some take strong, heavy cases out on a hot summer's day, and drag them up hill and down dale, as if there might be a possibility of a game of football coming on, and the cases intended to stand the kicking part of the fun. Take my advice, and adopt light, flexible, waterproof coverings only.

Have a bag of black material for each slide, and do not take the slide

out, no matter how good the cabinet making, except when under your focussing cloth, for insertion in the camera, and after exposure, re-insert the slide into its covering before you take it into the strong light. In these days of prolific amateurisms, it is no uncommon sight to see a young gentleman stand up as pert as a robin by his camera, with no protecting focussing cloth, or any cover whatever, and insert the slide, pull out the door, wait a bit in the full blaze of the sun, then expose, push the door back home with a bang of satisfaction, and look round as much as to say, 'There now, you see how it's done!' Such a careless worker would be lucky indeed to get even 'ifs' and 'buts' for his pains, or my experience must be of an exceptional 'foggy' nature; but, still the above example of tempting 'sunlight' is not rare. Therefore, to be safe, protect well your slides and camera when at work, and you will find it to pay.

Next to a too light camera, perhaps, there is nothing worse than a very light stand and a small top. Let the latter be large enough to permit the two limbs forming a leg to be opened out to give a good wide 'strutting spread,' where they connect on to the top of stand; the bottom of these limbs should reach nearly to the ground and then join together. A stand like this is not so portable, but it has the merit of being on a correct and rigid principle, better far than the centipedes, or many-legged stands, that bashful gentlemen carry in black leather bags, as if it were not as honourable to be taken for a photographer as a tea or Turkey rhubarb hawker!

If you adopt a centre limb to each leg of the stand, you will find it a great convenience for getting the parallel or level horizon in seaside work, or for levelling the camera generally; if you have a screw attachment to the centre limb of each leg, in addition to sliding, this will enable you to adjust the levels of the camera to a nicety, without disturbing the legs, or running the risk of bringing all down together, when on slippy rocks. I would gladly give drawings for the application referred to, but I fear I have already occupied too much space.

As to the best kind of lenses to use, I have always been wedded to single lenses of the old type for landscape and seascape work; they work with great depth and evenness and brilliancy of lighting. Some time ago I consulted the eminent authority on lenses, Mr. J. Traill Taylor, as to the feasibility of executing very large instantaneous pictures. He gave his verdict in favour of single lenses, for extreme sizes. His opinion has been fully borne out by results, and I can report that successful instantaneous pictures can be taken up to 20 × 16 (and is an accomplished fact), and possibly larger, and that with single lenses. For seascapes they will do with well stopping down. So much for rapidity.

I think the red-letter axiom should be, to use as long focus lens as the amount of subject you require on the plate will permit. Short-focus lenses have their uses, and work well, especially of the symmetrical type, but they should only be called into requisition in contracted situations, and when foreground altitudes have to be counted with.

A lens having a focus not less—I prefer a little over—than one and a half the length of the longest side of the plate, gives the most pleasing proportion of balance between foreground subject and distant objects. For whole-plate, 13 or 14-inch focus; for 10 × 8, 16-inch focus; 12 × 10, 20-inch focus; 15 × 12, 24-inch focus, and so on. It is, perhaps,

needless to say, that all straight-line subjects require double combination rectilinear lenses, and possibly the best form is the symmetrical type.

Do not stop down your lenses for landscapes. As soon as your foreground is in sharp focus, and verging into the middle distance proportionately, 'be satisfied.' Remember, you do not view nature through a telescope, the function of which is to bring distant objects near and sharp in detail. Stopping down a lens has just the same sharpening or defining effect, and, if adopted, all artistic feeling and idea of distance or atmosphere becomes lost, and a false balance substituted. Do not forget the axiom, that there are three balances to strive to maintain—balance of definition, balance of lines, and balance of light and shade—and that each is composed of opposites; the definite and indefinite, straight and convergent, and black and white. If you sacrifice any of these qualities that go to make a picture, you must not be surprised if your efforts end in disappointment.

I have tried a great number of instantaneous shutters, both patented, complicated, and simple, but think a plain drop shutter as good, or better, taken all in all, than any other. I believe it to be of no advantage whatever in landscape work to secure natural clouds on the same plate as foreground work, because what you gain in this way by the ingenuity of the shutter, 'if' you do so, you will as certainly lose during development, the sky has somehow such a knack of getting so dense before the foreground attains the necessary pluck. But, of course, this does not apply in marine work. For cloud negatives, insert in the opening of the drop shutter a piece of 'pale' smoke-coloured glass, such as spectacles are made of. This will neutralise the diffused light, which exists in great excess when the sun is in front of the lens.

The old-fashioned sky shade is a valuable addition to instantaneous shutters, or, indeed, for all times and places. I have three taper metal flaps, hinged at the top and two sides of shutter aperture, or other foundation for fitting on lens in front, these, when open, forming three sides of a cone—the angle of the cone is to be regulated by the focus of the lens—so that the outer edges just clear the field of the lens. The very important detail of shading the front of the lens from any strong extraneous light is one that very few workers ever give the slightest attention to.

My parting axiom shall be—never be tempted to omit backing your plates. I have often met many who did not think it a hardship to tramp about all day long, in almost tropical heat, carrying a heavy weight of photographic apparatus, without refreshment; in fact, thoroughly prostrating themselves with their labours in picture hunting, and thus devote a valuable day's holiday, seldom recurring during the year, spending a fair sum of money in travelling expenses, and, after all, return home with most of their pictures spoilt by halation. When asked why they did not take the simple precaution of backing their plates, replied, 'It's too much trouble,' or 'too messy a job.' To me, in view of the pains and penalties already cheerfully undertaken, this seems like the very essence of irony or sarcasm, or else a profound example of shortsightedness. It is, however, only too true, when people want to be lazy there are always reasons in abundance of a self-satisfying nature why the luxury should not be indulged in.

I will now give you the formula for a good mixture for backing your

plates, always remembering it is to be well shaken before taken. It has stood the test of use with me for years, and I recommend it as being 'all there.'

Get sixpennyworth of burnt sienna pigment ground in water from a colourman. For this amount I have generally had about twelve cubic inches, or a little box filled measuring four inches by three, by one inch deep; it should be delivered to you thick, of about the consistency of butter. To this add two teaspoonfuls of glycerine; this facilitates the removal of the pigment by rubbing pressure of a damp sponge before development. Two teaspoonfuls of strong liquid gum arabic will give the mixture adhesion, and remove the chances of powderiness. Well mix and thin down to the consistency of treacle with methylated spirit; this is better than water, because the spirit evaporating causes the backing to dry, thus facilitating the putting away of the plates into the slides. For use pour a little on a plate, slightly dip in a flat camel's-hair brush, or a sponge, and apply to the back of the plate.

In wishing all a happy new year, I would say, finally, do not forget that cameras and lenses are not, like dogs, to be ordered to go and do this and that. There is no automatic machine work in photography, and also, that unless you are willing to do your part truly and well, you had better find another investment for your money and brains than in picture making by photography.

PHOTOGRAPHIC PRINTING.

By G. Foxall.

Cannot some member in each photographic society, that does not yet possess the rule, propose an addition to the rules to this effect, 'That all photographs accepted by the society for its albums must be produced by one of the permanent processes?' I am sure the society would greatly benefit by strictly carrying out this rule, for in what a very different conditon its collections would be in, say, twenty years time; its members would, too, become more intelligent photographers if each one thoroughly mastered one or more of the permanent methods of printing, for it certainly does not require much skill to produce a good print on the popular ready-sensitised papers, the societies' meetings would then become more interesting, and the discussions more successful if more members were qualified to take part in discussing the several permanent processes; and then, too, I am quite sure it would be another nail in the coffin of our old fading friends, silver prints, who cannot, in my opinion, be too soon decently interred, and thought of with respect for their past usefulness, in the same way that we think of Daguerreotypes, collodion dry plates, and many other old friends.

For professional photographers to give up printing in silver I know, at the present time, to be an impossibility. There is still a great demand for these cheap fading things, and so long as this is the case, men in business must meet it; but I firmly believe that it is the fault of photographers alone that this demand still exists, for had such a perfect process as the carbon been manfully stuck to instead of being just experimented and played with, as it has been by most men in business

it would, owing to its resemblance to the silver prints, have easily taken their place. The only item that causes the carbon to be a more costly process is that of skilled labour. Now this in a very short time would not be the case, for if there was more probable demand for their services, more young men would become qualified, and carbon printers would be as plentiful as silver ones are now. The supply would very soon exceed the demand, and wages would soon come down: any skilled industry is soon over-done in this age of keen competition.

I am sure, too, much might be done in educating the public taste. If photographers would only really reproduce some *good* prints upon bromide paper and keep them prominently before their customers, one great inducement could be offered in addition to their permanency, namely, quick execution of their orders. How nice to be able to say after proofs had been submitted and approved, 'Two or three dozen for certain to-morrow evening.' A great inducement all will readily admit who have been much in a photographer's reception room trying to calm down, and patiently (?) listen to the grumbles of impatient sitters. A most attractive picture can be produced by this process if nicely finished. Just try one printed on the thin smooth paper, enamelled, and mounted upon a French grey bevelled-edge card. As to the cost of these, why photographers would be compelled to charge a little more than for silver prints at first, but that this could soon be reduced is certain, for owing to the greater demand for the prepared paper and oxalate of potash (the two expensive items in this process), the cost of these would soon come down, and any silver printer could easily learn all the very simple manipulations.

For amateur photographers who have ample time, there is no more interesting process than the carbon. The many different colours in which prints can be made, the ease with which photographs can be produced upon almost every surface, such as opal, glass, ivory, all kinds of paper, wood, &c., and the many little difficulties and troubles to be overcome, will always render it a good process for those who practise photography as a pleasurable pastime.

The platinotype process, too, is eminently suited to the amateur; the great care necessary in all its details, the small quantity of apparatus needful, and few manipulations before the print is finished, all render its study one of pleasure. The fact of its not having been a free process, but the subject of a patent, has always hindered its adoption by professional men.

But of all the printing processes the one most suitable to the ordinary amateur, who desires to use the little daylight he can snatch from business in making negatives, is that upon silver bromide paper, ordinary gas or lamp light being all that he will require. A large batch of prints can be got off in one evening, and thus the old excuse for only having a nice lot of very good and pretty-looking negatives to show his friends will not hold good, for how many of one's amateur friends produce a capital collection of negatives and hardly any prints when one drops in, saying, 'You know, old boy, I *cannot* find time to print, my wife does not like to be bothered with them, and if she does attend to two or three negatives, perhaps I find one print right out of six. I cannot get my wife to consent to my teaching one of the maids to print, she says they have enough to do without; and the children either forget all about them, or else smash the best negatives—so what *can* I do?' Now silver bromide

paper is the panacea for al these ills. For contact printing get the slowest paper you can, and print *only* in diffused light to get an even result. This being a development process, it is difficult to dodge and shade the negative when printing, as you can with silver paper, so the best way when any part requires slightly shading to get the best effect, is to coat the plate behind with matt varnish, and paint as deeply as required with Prussian blue water colour. The diffused light necessary for printing is best obtained by placing between the light and the frame containing the negative a sheet of fine ground glass or tissue paper. As to development, &c., you cannot do better than carefully follow the instructions sent out by the maker of the paper.

I am positive as to this, that if every photographer, both professional and amateur, would only do his level best to promote the adoption of these permanent processes for printing by using them himself and influencing others to do so, we should soon see an end of those who now prefer to produce things of beauty that are *not* joys for ever.

ENLARGING FROM SMALL NEGATIVES AND STRIPPING FILMS.

By G. A. Kenyon, M.B.

On looking back at my communication to last year's Almanac, the following observations occur to me to be desirable in the interests of its readers.

The Welsbach light, although very delightful in many ways, proved to require a small stop in the lens to ensure sufficient sharpness of detail, and then the exposure became too tedious a matter with Eastman paper, whereas the paraffin lamp, with half-inch argand burner, worked well with full aperture. Whatever the source of light I find it absolutely necessary to focus with the stop *in situ*. If the focussing be done with full aperture and the stop inserted without further adjustment the definition will be wofully deficient.

The following is the formula for the iron solution, to be kept in the soda water syphon. The excess of acid ensures brilliant clearness in the developed enlargement, without inconveniently slowing development, and lessens the need for acid washing after. Nothing can be more perfect than the way the solution keeps in the atmosphere of carbonic acid, and its constant readiness for use is a great convenience. Should the pressure give way before the bottle is emptied a little addition of acid and bicarbonate will replenish with ease :—

Ferrous sulphate	8 ounces.	
Bicarbonate of potash	90 grains.	Both in
Acid citric	150 grains.	crystals.
Water to about	32 ounces.	

The ferrous sulphate is dissolved in the water before placing in the syphon, the crystals are then put in and the cap with tap is screwed on quickly.

As I use the stripping films in a quarter-plate camera with a lens of

four-inch focus, details of the negatives are too small to be of any use, except for enlargement, lantern slides, or the stereoscope. Consequently I suffer no inconvenience, except as regards bulk, by leaving the stripped film on the glass plate, and I have the advantage of a film with a minimum of gelatine, and consequently as free as possible from the defects that a film of gelatine involves. Further, it is in a convenient form for the enlarging frame. Further, there is no shrinkage or distortion which might render stereoscopic views useless, and diminish from the accuracy of enlargements.

Stereoscopic views are very effective exponents of objects deficient in light and shade, of chasms and waterfalls, and of geological structure. I do not hesitate to exaggerate the effect where desirable by taking the pictures at any reasonable distance apart—and this is done by moving the camera and stand bodily. The development, &c., of the films does not involve the employment of more time or so much space as glass negatives, and if done systematically and as above little more trouble. I develop four at once, and only modify the development, except in case of known excess or defect in exposure, by longer or shorter duration in the developer. The proportions of the developer are of great importance, and when the best are once discovered should be scrupulously adhered to. The pyro should be carefully weighed and freshly dissolved. The exposure long, and development, say, occupy three or four minutes, to get the finest structure of image.

The following proportions answer to this description in my experience :—

A.

Dissolve 6 grains of pyro in 4 drachms of solution of sulphite of soda (15 per cent.), and add 5 minims of solution of bromide of ammonium (100 grains to the ounce).

B.

Washing soda solution (1 lb. to 80 ozs.)	1 ounce.
Water	1 ,,

One part of A to four of B.

As to leaving the films on the glass permanently, I reduce the bulk involved by using glass nominally the same size as the film—in practice the glass is just a trifle wider at the sides, sufficient to allow it to be handled without displacing the film ; it is often shorter at the ends but this is an advantage, as the overlapping helps to secure the film, and the only caution necessary is not to let it touch any object where it overlaps until dry.

The great advantage of a small and light camera with a long roll of films over glass plates, is that with the former you may have the means of photographing under limitations of time and space and labour, which might simply result in not being able to photograph at all with the more perfect medium. You can photograph anything you think at all desirable without having to waste time in deciding whether the subject is one worthy of one of a necessarily much more limited stock of plates, and you can keep up with non-photographic companions, and you have no terrors associated with the carelessness of porters.

After a long and tedious search I have at last discovered, in a set of

rigid legs, price four shillings and sixpence, a stand of lightness commensurate with that of the light fixed focus camera, weight one and a quarter pounds; length, closed, four feet six inches; rigidity complete. The camera is now fitted with a finder and focussing glass, and cloth has long been discarded. When using the full aperture of the P.S. lens on near objects, the front is, of course, advanced a notch or two.

I must apologise for so much detail, but success in most things depends upon a close attention to detail.

RAPID PLATES *VERSUS* SLOW.—FILMS *VERSUS* GLASS.

By George Mansfield.

A few words on two subjects on which I have before written in The British Journal Photographic Almanac, and on which my ideas have been modified by recent experience, may perhaps prove useful to some of my brother amateurs.

Last spring I made an interesting tour in the north of Spain, principally with a view to photography; and as I work 14 × 10, and was going to out-of-the-way parts where the transport of heavy luggage would be a difficult if not impossible matter, I deemed it a good occasion to replace heavy and brittle glass plates by films and paper. I took with me some dozen Vergara's Frœdman films 14 × 10, and a roll of Eastman's stripping film for my roller slide (Sharp's patent). The result of my work was not as satisfactory as I could wish; but I must confess that it was principally due to my want of experience in the use of the films than to any inherent defect in them. I under exposed nearly all my pictures, and more especially those on Vergara's films; and I believe if I had had more experience in their development, I could have got more out of the Eastman films, even when the exposure was defective.

The principal result of my experience is that the Vergara and the stripping films are not rapid enough for the wants of the *tourist* photographer. I have, as a rule, advocated a *slow* plate for landscape work; but I must confess that recent experience has shown me that pure landscape work—that is, without life—is seldom found when touring abroad, and is not to be desired, as a few figures, animals, or groups of figures, give a character to scenery that much enhances its artistic merit, and street views can seldom be taken without people being about. To obtain these figures you must have a plate or film that admits of rapid exposure, as otherwise the figures *will* move, or else stand so stiff as to produce an unnatural effect. Drop-shutter exposure is not generally required, but about what is described as cap off and on. There will, of course, often be found dark gorges, unlit sylvan glades, and masses of foliage, where such an exposure will be impossible; and in these cases it will be better to leave out figures, or be content with a fellow tourist or confidential guide on whom you can count to remain still.

With the present improvement in emulsions, it is as easy to obtain good, vigorous negatives with the most rapid films as with the slower if the necessary care be used in development. Another advantage in the use of very rapid films is that in case a subject for instantaneous effect presents itself you are able at once to secure it. I believe there is no

practical reason why a film on paper or gelatine should not be as rapid as on glass; indeed, I understand that within the last few months the Eastman Company have supplied for their newly invented Kodak very rapid films. I trust they may put the same on the market in large rolls.

The convenience of the films and paper when travelling has made me quite determined never to undertake a long excursion again with glass plates. Having ordinary solid double dark slides, I found a very good way to expose the films is to replace the ordinary metal division which separates the plates by a light wood board fitting *exactly* into the slide. Over each end I passed a *flat* elastic band under which I could slip the ends of the films; I changed them without removing the board. I found they remained very flat, and I only lost one film on my tour through the breaking of a band.

The development of both films and paper gave no particular difficulty. The paper proved more manageable in the developer, as a wet gelatine film is always a slippery customer. The paper, however, demands more care to avoid stains and finger marks on the back. This, of course, is of no consequence if the films are to be stripped from the paper; but I must confess that I feel rather nervous at the idea of putting a large negative through the complicated and risky process of stripping, and I have found that printed as paper negatives they are absolutely devoid of grain.

Where the paper films have a marked advantage is in the ease with which they are dried. With the gelatine films I found considerable difficulty, as, even after soaking in alcohol, they were apt to stick to the blotting paper, and the whole operation had to be recommenced. With the paper, after a couple of changes of blotting paper you could put them under pressure, and any little filaments that stuck to the surface could be brushed off with a clean handkerchief. The films have, of course, the advantage of much quicker printing, and it is easier to judge of their density when developing.

My conclusion is, that glass must be given up as a support for gelatine films whenever the size employed is large, and the work to be done entails a journey away from home. The sooner, therefore, makers of films and papers give us their products coated with most sensitive emulsion the better; as otherwise there are many cases where glass will have to be used, despite its drawbacks. Paper has the great advantage that it can be used in a roller slide, the most perfect method of carrying a large supply of material yet invented. If, on the other hand, a better method of drying could be found and a good way of exposing suggested, the gelatine support would seem, from its transparency and resemblance to glass, to be the most natural substitute for the latter.

SALT IN THE OXALATE DEVELOPER.

By H. G. Moberly.

Last year's Almanac contained an article on the use of sodium chloride as an accelerator, with special reference to the ferrous oxalate developer. I had previously used common salt in the form of a preliminary bath of the strength of fifteen per cent. in which to soak the plate before putting it into the developer, and found that a very distinct gain in density and

clearness of image was the result, but I did not notice any particularly accelerating effect, and I still had to use a certain proportion of bromide in the developer. This year I have, however, added salt to the mixed developer, and find that the same results are obtained with less salt and less trouble, and with the advantage that development is completely under control and bromide may be dispensed with. I have used as large a proportion as six grains to the ounce of mixed developer (one of iron to four of oxalate), but this is rather excessive and for most purposes ten drops of a ten per cent. solution would probably be the best proportion and form in which to add the salt, increasing the quantity in cases of over exposure. I have only tried this modification with Eastman negative paper, but I have no doubt that it would work equally well with other makes of plates, and I can certainly recommend it for trial. The great advantage of oxalate development for Eastman stripping films is that it has no tendency to harden the soluble gelatine, consequently that water at only 120° is quite hot enough for the stripping bath, and that it is just as easy to strip the negatives whether they have been dried first or not. The addition of salt does not in any way interfere with the power that tartaric acid has in sunlight of reviving used developer, and in the development of lantern slides and Alpha paper with such revived developer it appears, indeed, to give superior results.

I find that for Alpha paper it is best to use a *fresh* toning bath of the composition given by me in last year's ALMANAC. If care be taken to stop the action as soon as the surface colour has changed to a bluish grey, and while the colour by transmitted light is still decidedly brown, the results are much more uniform and reliable, and the ultimate colour a rich black with a slight tendency to brown black in the shadows, altogether superior, to my mind, to the colour of a bromide print.

NEVER!

By CHAS. A. PARKER.

NEVER think that photography is to be learnt by simply reading a shilling manual on the art.

Never imagine that photographic processes are capable of being worked like a piece of machinery.

Never forget that brains are required in all photographic operations.

Never suppose that the cheapest apparatus will be suitable for all classes of work.

Never buy a camera that is without a double swing back.

Never buy the latest patent simply on the maker's recommendation, but wait to hear the opinion of experienced men.

Never allow a loaded slide to bask in the sunlight and then blame the maker because your plates are fogged.

Never forget to cover both camera and slide with the focussing cloth during exposure.

Never focus without employing a small focussing glass or hand magnifier.

Never attempt to photograph the interior of a church or cathedral without having three small pieces of cork with which to shoe the tripod legs.

Never try to see how many plates it is possible to expose during an afternoon ramble, but rather spend the time in securing one good negative than half a dozen indifferent ones.

Never expose the same plate twice, as this seldom leads to a good result, but avoid it by letting small ivory number tablets into the woodwork of the dark slide.

Never draw the shutter or uncap the lens until satisfied that, *cæteris paribus*, the result will be worth the trouble.

Never omit to dust the plates before placing them in the dark slide; a neglect of this precaution is the frequent cause of pinholes.

Never forget to number the plates before placing them in the slides, if you wish them to tally with the note-book.

Never find fault with your apparatus until convinced that you are capable of handling it properly.

Never omit to soak the plate in clean water before applying the developer, as this softens the film and allows it to act evenly.

Never let the developing table or sink remain in a litter but always have plenty of elbow room.

Never trouble about the last new developer when you are getting reliable results with your own.

Never omit to sponge the developing dish after each plate.

Never take the trouble to shield the plate from the light after washing off the developer as it is not needful, but during development keep the dish well covered, even if the light is 'safe.'

Never invoke blessings (?) on the plate makers' heads until satisfied that no blame should attach to yourself.

Never rest satisfied with negatives in which the edges behind the rebate are fogged, but test the camera and slide and find out the cause.

Never put trays and measures away dirty.

Never keep chemicals in unlabelled or unstoppered bottles.

Never pack plates with interleaves of cardboard or paper, as this almost invariably causes stains. Pack them film to film in blocks of a half or one dozen; no harm will result from this plan.

Never trouble the Editor of the JOURNAL with queries until you have looked through the back numbers.

Never forget that 'order is nature's first law,' and that there should be 'a place for everything, and everything (should be) in its place.'

Never get into a dispirited, slipshod style of working, or say, 'that's near enough,' when there is room for improvement; and never imagine that anything will do by way of experiment.

ENLARGED HEADS ON WHATMAN'S PAPER.

By HENRY HOLMAN.

THERE has always been much said about the purity of paper for photographic purposes. Very few photographers would believe that there are plenty of papers ready at their hand pure enough for the practical purpose of enlargement. Doubtless for fine work ordinary paper would be quite unsuitable, but I have found that the most common paper can be easily prepared and coated with emulsion, and may yield good prints and enlargements.

Of course this does not affect the fact that the best results are gained on the best paper. As a rule we have to go abroad for our best photographic papers, which is a pity for more reasons than one. However, there are papers made in our own country which are very pure, and for our present purpose better adapted than the ordinary foreign make of paper. Pirie & Sons (Aberdeen) make a paper, namely, genuine vellum wove, which is very pure. It has also a slight cream tone, which makes it very agreeable. I have had some of it coated for over twelve months, and still develop clear and black, without spots. This explodes the theory that only the purest of papers can be used, because it is not specially prepared. In any way, it is simply made, and sold as an ordinary writing paper; besides, it is very cheap. Whatman's paper is made in three degrees (of roughness), namely, rough, medium, and hot pressed. The medium paper yields enlarged heads of great beauty and softness, equal in crayon-like appearance to the best effect of a master of art. If the negative be retouched so much the better, as the stippling will show in the enlargement soft and round, and a few judicious touches will finish it.

The preparation of the paper is as follows:—To every drachm of gelatine add five or ten grains of chrome alum; water, four ounces. This can be dissolved (the alum thickens the gelatine after a little) and liquefy with acetic acid. If thought desirable the emulsion or solution is spread on the paper with a broad brush, the same as an artist would smooth a canvas, hang up to dry, and the surface will grow quite hard, and the printed picture will be on the surface, and not have that sunk-in appearance which enlargements usually have when prepared on raw paper. The words on page 54 of the ALMANAC for 1885 are worth looking up. If the gelatine be reduced to one drachm the results will be hard to beat. Also at page 116 I give a safe and sure method. To coat the paper, damp it, and then squeegee on to a slab of glass, turn up the edges to form a dish, pour like collodion, put back the excess, set, and hang up to dry. The rest of the details are quite familiar to most workers, therefore I can only repeat the old story—correct exposure, iron development, and success is certain.

THE RIGHT TO THE NEGATIVE.

By F. A. BRIDGE.

A FEW weeks since I was called upon by a gentleman of whom I had taken some portraits at the end of last year. He reminded me of having taken the pictures, told me he had recently become an amateur photographer, and had 'called for *his* negatives.' I told him I should be pleased to supply any reprints. He said, 'No, thank you, I can do them myself now, and they won't cost a quarter of what your charge would be.'

Rather amused, I pointed out that before he could produce prints from the negatives taken by me, he would have to obtain possession of them.

'Certainly,' said he; 'they are my property, I paid for them, and I can demand them.'

I ventured to point out that there was no law to prevent his

'demanding them,' his only difficulty would be to make me give them up. 'However,' said I, 'just let me make sure that I have them. Kindly excuse me a few minutes.' I found the negatives without much difficulty, and returned to the gentleman. 'Well,' said I, 'they are all right *at present*. Will you buy them?'

'No,' said he, 'certainly not. I have already paid for them once.'

'Will you pay for any more copies to be printed from them?'

'Certainly not,' said he.

In vain I endeavoured to explain that the charge did not entitle him to the negative, which was, of course, merely taken in order to produce the prints for which he paid. It was all of no use. Again I begged him to excuse me a moment. There was a noise as of the breaking of glass, and on my return to my visitor I said, 'My dear sir, I regret to inform you that the negatives about which you called are each in something like a dozen pieces, and are at the present moment in my dustbin. Allow me to wish you good morning.'

I was threatened with all sorts of 'actions at law,' but up to the present I have heard nothing further of the matter.

Most professional men are tolerably familiar with the 'cool' requests of amateurs, but surely this question of 'right to the negative' cannot be seriously entertained by many.

I have always maintained that when pictures are taken in the usual course of business, and no stipulation made with regard to the negative, the sitter or customer has no property in it, and it is saleable in the ordinary way as part of a photographer's assets. Of course it must not be used in any way to the detriment, or against the wish, of the customer; but that is quite another matter.

Your contract with your sitter or customer is to produce so many *cartes*, cabinets, or whatever the size may be, and when these are delivered there is no obligation on the part of the photographer to keep the negative five minutes. He usually does so for his own profit, and his customer's convenience; but even though his cards say, 'Additional copies may always be obtained,' this is not in any way binding, because it cannot be legally called an agreement without being dated, signed, and stamped. The Copyright Act is, in many respects, quite nuisance enough, without fresh vexations, and if this 'right to the negative' were once conceded, photographers would sometimes have a lively time of it.

Let us take a few instances.

A baby is brought by its aunt to be photographed. To whom does this negative belong? The baby, its parent, or the aunt who pays for the pictures?

A young lady of sweet seventeen pays us a visit. To whom does this negative belong? The young lady is a minor. Her father? No, she is an orphan, and a ward in Chancery to boot. Why, the poor photographer might find himself in prison for contempt of court in less than no time.

A gentleman of full age sits for his photograph. Three negatives are taken, but only one is approved. If the one used is the sitter's property so are the other two.

Three young ladies (who are bosom friends to-day), or an engaged couple, are taken together. They quarrel before a month is out, and each demands the negative,

To carry this *reductio ad absurdem* a little further. A wedding group is ordered. To whom does this negative belong? The bridegroom, his father, her (the bride's) mother, the guests collectively, or the clergyman who performed the ceremony?

One thing seems certain. If it is ever decided that the customer has a legal right to the negative, it will be necessary for photographers to have a distinct understanding in every case, so as to know for whom he is taking care of it.

WASHING PRINTS.

By Geo. M. Rabbeth.

As I know many people, like myself, consider toning a long and tedious business, perhaps they will find my plan of washing prints somewhat lessens the labour. I have a watering can holding about half a gallon of water, and after dipping the prints into water, I place them in the can and hang on tap over sink, tilting so that waste water may run off through the spout, leaving tap turned on, so that the can is always full of clean water. In a very short time they will be found ready for toning, and after fixing the same process will clear away the hypo.

An excellent dish for toning will be found in those shallow vegetable dishes which I suppose are in every house, a stick of lead pencil placed under centre of dish making a good rocker.

PHOTOGRAPHING IN EGYPT.

By Horace Warren Gridley (New York).

As it is very probable that some of the many readers of this Annual may be contemplating a trip to Egypt this coming winter, a few words upon photography in that beautiful country may not come amiss.

I most strongly advise that the gelatino-bromide plates taken should be of the slow order, about twelve on Warnerke, certainly not more rapid than fifteen, thickly coated, and rich in silver. With such a plate you have great latitude in exposure, and I think that the only means by which one can get a 'soft' negative in a country where the lights and shadows are so very strong, is to give full time, and develop carefully, beginning with a very weak solution, and gradually strengthening as the case demands. The reason why many photographers fail to get good negatives in Egypt is, I think, due to under exposure.

I have taken many negatives in the East, and I have given, with the best results, quite as long exposures there as I would in England on a bright summer's day. By doing this there is a very fair chance of getting a fine negative. Of course, I take it for granted that the photographer thoroughly understands the art of developing; and just here I will remark that another great mistake is in using too much pyrogallol. Some of my very finest negatives were developed up to full density with half a grain of pyrogallol to the ounce of solution. I should also advise cases made of waterproof cloth for the 'backs' as a safeguard against dust. This is certainly the photographer's *bête noir* in Egypt. It is not pleasant, after developing and fixing a plate, to find it perfect in every

way except that the surface is covered with any quantity of minute pin-holes, which, from their number and close proximity, it is simply impossible to 'touch out.'

The search for the picturesque is most conveniently done on donkeys. The price in Cairo of a good donkey per day, including boy, is about four shillings.

In regard to customs, &c., I have always landed at Alexandria, and, therefore, can only speak from experience as to that port. I have always been treated with the greatest courtesy, but in case of any objection on the part of the examiners to allow plates to pass unopened, I should demand to see the Chief of Customs—Mr. Towrest, who is a Scotch gentleman, and an enthusiastic photographer, whose experience extends back to the old wax paper days, and I am sure that an interview with him will set 'all things right.'

In conclusion, I will say that, to my mind, a winter cannot be more pleasantly spent than in photographing this old land of the Pharaohs.

ALCOHOL TUBE ATTACHMENT TO A LIMELIGHT BURNER.

By F. C. Beach (New York).

On the device here shown is a very simple attachment to the ordinary limelight jet, which, I am informed, was devised by Mr. Geo. M. Allen, of New York, and was constructed for him by Mr. A. G. Tisdel, of the same place.

Fig. 1 is a side elevation, and fig. 2 a plan view. E is an extra tube

FIG. 1

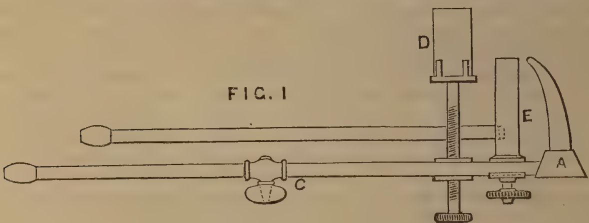
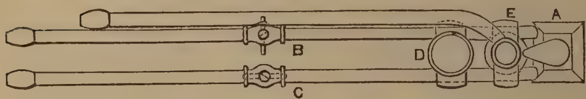


FIG. 2.



clamped on to the gas tubes, B C, between the jet, A, and the line D. From it a rubber pipe connects to a vessel holding alcohol. Wicking is put into E. To use the burner on the blow-through principle, the hydrogen faucet, B, is shut off, which allows the oxygen gas to enter through the tube, C, and blow from the jet through the alcohol flame, rising from the

tube E. The advantage is that one burner answers for two purposes. When the mixed jet is used the attachment is removed. When alcohol is employed the attachment is put on. The illustration clearly shows the idea.

FILMS AND PLATES.

By A. Pumphrey.

It is with dry plates as it was formerly with collodion—after a few years of discussion on the main subjects as to the best way of producing and working, attention afterwards turns to side issues, and, step by step, we become more and more the masters of the process on all sides. During the past year, both in this country and abroad, several workers have been trying their hands at converting plates into films. The method which I have adopted is somewhat different to that of others; that it may be of interest to your readers, or to some of them, I therefore give the details as below.

The agent which is used is hydrofluoric acid. It has been usual to put the negative into a diluted solution. Instead of this, I take a dried negative, old or new, with varnish removed (if it has been varnished), and apply to the surface a film of plain gelatine moistened with a diluted solution of hydrofluoric acid, one part of acid to sixty of water; the acid softens the film and makes it very adhesive; the film itself is supported on a paper back with a slipping medium of indiarubber, which medium will hold the film while wet and release it when dry. The acid from the film passes through the negative, softens and releases it from the plate, and the lifting paper serves to hold the combined film during the lifting. It is then pinned down on a board, face uppermost, and allowed to dry. When taken from the board the slipping back is withdrawn, and you have a negative thin enough to print from either side, and one which is very useful for stereoscopic pictures, as the negatives can be cut and printed from without any trouble with mountings right and left.

A very useful application of this form of lifting the film is when a glass carrying the negative is cracked, and it is certain that if put into the printing frame it will go worse, it may with care be lifted and the negative saved.

In the matter of working films there has been introduced one element of danger and loss, as I have found to my cost. I allude to the use of glycerine to prevent the film becoming quite hard as it dries. Such negatives are much more likely to become damaged by contact with highly albumenised and silvered paper than those which dry perfectly. I have discontinued the use of glycerine; and more than that, I found ordinary varnish a poor protection for negatives. I therefore print from all negatives, either plates or film, without varnishing, and instead use a thin intervening film of plain gelatine of such a thickness as not to interfere with the sharpness of the print.

Seeing now that plates can be converted into films, is there any right place for their use? The right place is, I think, for foreign travel, and to enable a larger size to be taken. In May last, in company with some other tourists, I did a series of 9×11 negatives in Italy, and my experience

was that it would have been impossible to work that size on plates unless the excursion had been entirely devoted to photography.

Films get over not only the question of weight, but the care required in packing is so much less than with plates; during a five weeks' out, in which I made one hundred and seventy exposures, I was only obliged to re-charge my slide three times, and half an hour during the time was all that was specially devoted to packing the exposed and unpacking the unexposed films.

WORTH TRYING.

By John F. Echlin (Hobart, Tasmania).

The effect of photographing interiors by gaslight is by no means new, yet probably very few have tried it. By its means I have recently produced a novel effect, which I recommend to my brother amateurs as 'worth trying.'

With a wide-angle lens in your camera, focus, by daylight, a window of an interior having a pleasant look-out. Leave your camera focussed till dark, draw up the window blind—say three-fourths of the way—light the gas, and expose for from twenty-five to thirty-five minutes. Cap the lens and leave standing till daylight. Then uncap and expose (for the exterior) according to your light. The result should be a brilliant view of the interior as well as the landscape outside.

It is necessary that the camera should be placed at such an angle that it will not show the reflections of the gas lamps in the window. I need hardly add that it is requisite the operation should be performed on a dark night.

NOTES ON INTENSIFICATION.

By George Lindsay Johnson, M.A., B.S., F.R.C.S.

If we were to compare the negatives taken during the last few years with those made ten or fifteen years ago, one thing would strike us forcibly, viz., the enormous increase in the proportion of under-exposed negatives, and that in spite of the fact that plates are made immensely more rapid now. The reason is that these rapid plates make the photographer ambitious to catch Dame Nature in a dynamic condition, and to attempt to secure effects which formerly would not have been dreamt of as possible. Consequently, the field is flooded with negatives more curious than artistic, and more conspicuous for the audacity of their theme than for their technical excellence and beauty of composition. Now, in looking over the negatives of my friends, I have been astonished to see how very few are really perfect, and how very many would be greatly improved by a judicious strengthening. The invariable answer to the question, 'Why do you not intensify these negatives?' is either, 'I have no time,' or, 'I am afraid of spoiling the negatives, and I can't bear to risk them.' I have made some experiments in this direction lately, and have, I think, arrived at a modification of a well-known method which *never fails* to give me satisfaction, and which, if the following directions are carefully adhered to, will not fail in the hands of any of our readers, and, more-

over, takes up very little of one's time. Let us suppose we have a negative which does not print well, and on examination we find it is either veiled with slight fog, or flat from over exposure, or else under exposed and thin. Now these three conditions are the cause of at least eighty per cent. of all poor printing negatives, and yet every one of these negatives can be made to yield excellent prints, or at least be improved by judicious intensification. Let us take the last condition first. The negative is brilliant, but poor and thin. Proceed as follows:—

A. Take of—

Perchloride of mercury	100 grains.
Bromide of potassium	100 ,,

And add distilled water to make ten ounces of solution. *Keep in the dark.*

B. Take of sulphite of soda one ounce, and add water to make ten ounces of solution. *Keep in the dark.*

Now thoroughly wash the plate under the tap; transfer it to a saturated solution of alum and leave for fifteen minutes, rinse under the tap, place the negative in a dish, and cover with the perchloride solution, and keep the plate rocking.* How long the negative is rocked does not matter, but it must be continued for several minutes (from five to ten minutes usually), until it refuses to bleach any more. When this is the case, rinse under the tap once more, and rock again in a fresh dish containing some of the sulphite solution. Continue to rock until, on turning the plate over, no white is seen on the back, *i.e.*, as any negative would appear when ready to leave the hypo fixing bath. Now rinse and wash well, and it is finished. One thing I have found necessary, viz., to work all the time in a yellow, or candle light, or at least to cover the negative while being rocked with a piece of yellow glass. At any rate, I failed to get uniform results when I neglected this precaution, though it *may* have been due to other causes. To ensure success the points to attend to are:—

1. Use *perfectly* clean dishes, free from all traces of 'hypo.' I never use anything but white porcelain dishes myself, as one can see whether they are clean at once.

2. Let each process be complete. Don't take the negative out of either bath until all action is finished, or you may otherwise get spotty or streaky negatives.

3. Rock all the time.

4. Work in artificial or yellow light.

5. See that the negative is perfectly fixed, clean, and free from hypo before commencing to intensify.

In the case of negatives which are veiled, or *slightly* fogged, or flat from over exposure, we must behave somewhat differently. Begin by a good washing and soaking in alum, rinse again, and then transfer the negative to a reducing bath. For this purpose the platinotype 'perfect reducer,' diluted, does excellently, but any of these iron or ferricyanide reducers will do. In any case a white porcelain dish is absolutely necessary, because if a black dish be used you cannot determine the

* An automatic water-wheel rocker is much the best contrivance, as one can leave it rocking and attend to other things. A capital one is to be seen at the Photographic Society's Exhibition, Pall Mall. Hinton, of Bedford Street, Strand, and the Stereoscopic Company keep it, I believe.

precise moment when to stop. Now rock and watch the image very carefully, and as soon as it begins to thin take it out *instantly* and flood with water, yet do not use too strong a stream, else the water may injure the film (which is always more tender after the reducer has acted on it) either by causing blisters, or by washing away some of the gelatine itself. As soon as you have well washed the film, transfer to the perchloride of mercury bath, and proceed exactly as before. The result will, in any case, be a great improvement. The sickly negative grows in vigour, the flat one becomes more brilliant, but yet thinner, by the reducer, and gains fresh vigour by the intensifier, and lastly, the veiled negative loses some of its fog by the reducer, and is strengthened by the second process. The only points to attend to in this are to use a weak reducer, to keep your eye well fixed on one spot on the negative, and to lift the latter out at the right moment. If the yellow glass and mechanical cradle be used, one need pay no attention to the intensification, and, indeed, I often set two dishes rocking at once, with two or three plates in each, and leave the room for an hour or more, without any anxiety as to the result, nor do I find that you can do a negative any harm by leaving it that time either in the alum, the mercury, or the sulphite baths. On the other hand, you must never take your eye off the negative in the reducing bath for an instant, or the image will thin beyond control. It is, however, a curious fact that slight reduction, immediately followed by intensification, gives a denser negative than intensification applied directly to a negative.

TIMING AN INSTANTANEOUS SHUTTER.

By D. E. Benson.

Some eight or nine years ago I purchased an instantaneous shutter, and, of course, the first thing to do was to time it.

A clockwork arrangement, with a finger turning round once in a second, not being obtainable, the best available means had to be adopted.

My bicycle, therefore, was taken out into the sun and turned over, so that the handle bar was on the ground and the large wheel free to spin.

At the rim end of one of the spokes I attached a mercurial thermometer, removed from its wooden support. The bulb being globular reflected the sun, as a fine point of light, through the lens of the camera in whatever position the thermometer was, when revolving, with the wheel.

The camera was then placed directly opposite the centre of the large wheel, on the sun side of it, and focussed, the plate inserted, and the shutter adjusted ready for exposure.

The bicycle wheel with the thermometer attached was next spun round on its axis until it had a fair velocity. From the commencement of a minute the revolutions of the wheel were counted, at the half minute the shutter was let go, and the revolutions continued to be counted till the end of the minute.

The plate was then developed, and showed a fine black line extending part way round the circle made by the rim of the wheel. This was the reflected light of the sun, and showed the arc through which the wheel had turned while the shutter was open.

Now for the time value of that arc.

Suppose that during the minute the wheel had revolved sixty times, then at the half minute, when the shutter was let off, the wheel would be going *at the rate of* sixty revolutions a minute, or one revolution per second, and if the arc subtended by the fine black line was 36° (the tenth of a circle), the time of exposure would be one-tenth of a second.

Suppose the wheel had performed seventy revolutions in the minute, it would at the half minute be going *at the rate of* seventy revolutions a minute, or one in six-sevenths of a second. The arc being the same as before, the time of exposure would then be one-tenth of six-sevenths of a second, or three thirty-fifths of a second. Arcs greater or less than the above give times of exposure proportionately greater or less.

This method gives the actual time that the light is effective on the plate, and, as almost every one either has a bicycle or tricycle nowadays, or knows a friend who would lend one, it is easily within the reach of all.

TRY EVERY NEW FORMULA AND ADHERE TO THE BEST.

By Max Boelte (New Jersey, U.S.A.).

Most assuredly this should be, and probably is, the mâxim for any earnest and studious photographer. Hydroquinone, since it made its appearance as a component of the deveveloper for dry plates, was said to be the very *desideratum*, some even called it the *ne plus ultra*, and much, very much, has been said and written about it. Practice, however, has shown plainly that it did not fulfil the expectations and claims. During this present year, the hydroquinone has been on this side of the Atlantic, as well as in Germany, the every-day battle-cry, and many a learned man, and principally one in Berlin, has written much about his own and his son's experiments, and the magnificent results they say they have obtained.

Now, it strikes me, that when formulæ are published in the metric system, which is the very same all over the world, and developers with hydroquinone, &c., are carefully compounded after them, that such splendid results as are claimed by the authors of said formulæ, the resulting plates never are good, and always show more or less veil, and by no means give such brilliant, clear, and soft negatives as when developed by a good pyro soda or pyro, potash, and soda developer containing the requisite sulphite of soda.

Formulæ, when given to the public, should be true in every respect, and men of high standing should not lend their names to be used as a medium for advertising purposes, or should have the honesty to make only such statements which are the true and real, but should not say that they obtained splendid negatives with hydroquinone when, in fact, the formula as published by them does not give a clear bright negative free from veil. The suggestion is near, that as there is a colour blindness there may also be a *negative blindness;* that is, that the operator does not or cannot see the defects in the negative which he developed by his favourite hydroquinone formula. He who desires to produce good clear negatives, let him try all the published hydroquinone formulæ and com-

pare the results with those he obtains by the pyro-soda developer, and he will find soon to which side the balance inclines. I have experimented with hydroquinone, and as I have noticed that the statement was made in The British Journal of Photography that hydroquinone does not work well with some classes of dry plates, I carefully have investigated all those brands of dry plates which we can get in New York, but I have come to the conclusion that pyro soda in every respect is much better than any hydroquinone. If cloud effects are desired hydroquinone may find its place in the pyro developer, that is, in a rather homeopathic dose.

FIRE AND WATERPROOF PAINT FOR STUDIO WALLS AND CEMENT FOR GLASS DISHES.

By Richard Parr.

A capital paint for reflecting walls, studios, &c., which is both fire and waterproof, can be made by grinding with a muller on a marble slab kaolin and solution of silicate of soda or potash and thinning it with water ; it can be tinted if required with ochre, umber, or oxide of iron.

The same mixture, I find, makes a good cement for glass dishes, and smeared over corks and around stoppers forms a lute which will effectually confine most volatile substances to their bottles, and being a good all-round friend in need I submit it as being worthy a corner in the Almanac.

STRIPPING NEGATIVES.

By H. J. Burton.

As a contribution to The British Journal Photographic Almanac for 1889, I think that a few remarks on stripping negatives from their glasses to other surfaces may be useful to many. Although the operations are simple enough, still a few details, by one who has had some experience, cannot fail to be acceptable ; and, for the sake of clearness, I will explain the method, which has been found to give the best results, under separate heads, and will begin by—

Stripping a Negative from a Cracked Glass where the Film is not Broken.

Support the negative upon another glass and level them upon the levelling stand; coat with ordinary transfer collodion, using enough to just cover the negative. When the collodion is thoroughly well set (about ten minutes) place in water at about 60° till all greasiness has disappeared. Change the water and add a few drops of hydroflouric acid, and watch while gently rocking the dish. In about a minute the film will begin to rise at the corners ; when this occurs lift the negative out at once and well wash under a rose. Now take a plate prepared with hard gelatine and dried—larger than the negative to be stripped—lay the plate at the bottom of a dish of clean water, float the negative off, and lift it out upon the prepared plate. Drain and dry spontaneously. When dry, the collodion may be removed with its solvents, assisted by cotton wool.

To Strip a Negative when in Two or More Pieces.

Lay the negative face downwards upon a piece of glass and fit the

pieces together, using gummed labels to keep them in position and to cover the cracks completely. When dry lay another glass upon the negative and turn the whole over, removing the top glass. Level, coat with collodion, and treat as above.

REVERSED NEGATIVES, FOR CARBON PRINTING, &c.

Level the negative, coat with collodion, and treat as above, but taking care to reverse the film in the transfer, that the collodion side may be next the substratum upon the glass. If the negative is required as a film, the substratum must be much thicker, and the plates should be prepared in advance, as follows:—French chalk the glasses, coat with collodion and dry. Wipe the collodion from the edges for one-eighth of an inch with a damp cloth; level and coat with—

Coignet or hard gelatine	5 ounces.
Glycerine	5 drachms.
Water	1 pint.

Allow two fluid ounces for each 10 × 8 plate.

Carbon transpancies may be successfully stripped by the same means, even if they have a collodion substratum.

NOTE.—Take care to perform the operation in a cool room. The collodion and water for soaking must be warmer than the room. Neglect of these precautions will cause air bells to appear in the set collodion films. The dish or other vessels to contain the dilute acid must be of ebonite, gutta-percha, or lead.

PRINTING.

By C. C. HODGSON.

Now that so many methods of printing are at our service, beginners will find it somewhat difficult to make a choice. I therefore offer these few observations in the hope that some of our more recent recruits may find in them a useful hint or two.

Most workers, I think, will agree with me that it is unwise and, at the same time, inartistic to confine ourselves to the adoption of only one mode of printing in general work, so I would suggest that it is desirable to become *au fait* in at least three of the many means of producing finished pictures. Those I would especially recommend are the Eastman permanent bromide, the platinotype, and the time-honoured silver processes.

I have generally found that negatives which are uniformly lacking in density print best on bromide paper. Those also which are merely weak in parts can, on account of the shortness of the exposure, be so manipulated by the weaker portions being held away from the light, that a perfectly even print is obtained. I have found these expedients to be of great service in the case of negatives which would otherwise be almost useless.

Negatives with strong contrasts, if portraits or groups, will be best treated with the old silver process, and if of views, by means of either the Pizzighelli or old platinotype. Silver prints are, to my mind, only fitted for portraiture and groups. Should warm tones be required the platinotype will supply them, but if purple are very much wished for, then Alpha paper will be found excellent.

For general purposes the bromide paper has many advantages, not

the least of which, and one all important to amateurs, is the convenience of being able to take prints at night. A great saving of time is also effected, particularly in printing from small negatives. For instance, four prints may be taken from one quarter-plate negative on a whole-plate piece of paper by exposing it successively in each corner of the frame, the rest of the paper being screened by a piece of cardboard the size of the paper from which one corner equal in size to a quarter-plate has been cut. Of course the frame must have in it a piece of clear glass. For those who work in larger sizes, negatives of greater dimensions may be similarly treated.

An expeditious way of printing quarter-plates consists in selecting four of equal density and exposing them all at the same time in a whole-plate frame. A 12 × 10 frame may be equally utilised—eight quarter-plates, or six 5 × 4, can be effectually printed in this manner. These are then all exposed and developed as one print. This form of printing may not inaptly be termed *wholesale slaughter of prints.* With a little practice and care in choosing plates of as equal density as possible, a 'heap of time' may be saved, and as many as a gross of prints can be finished in an evening, although the results thus obtained are naturally not quite so satisfactory, or I should rather say so uniform, as those done singly.

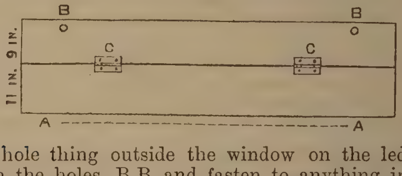
TWO PRINTING AUXILIARIES.

By Gambier Bolton.

Most of our English window ledges are too narrow to allow of more than a few small printing frames to be exposed to the light at the same time, but by making in a few moments, and at a trifling cost, two or more (of what I will call) printing boards, you will be able to expose quite three times the number of frames on each, your negatives will be well out in the light, and yet the windows can be kept closed and the house free from draughts.

Get two pieces of board, say 3 feet 6 inches long, or whatever the width of the windows may be; they should be three quarters of an inch thick. One must be 9 inches, the other 11 inches wide. A strip of wood the same length as the boards, $1\frac{3}{4}$ inch wide and three-eighths of an inch thick; a pair of stout, common hinges, with screws, and you are ready to make your printing board.

Lay the pieces of board together, and screw on the hinges, C C, nail the strip of wood on the front of the widest board, A A, bore two holes through the narrow board, B B, and it is ready for use.

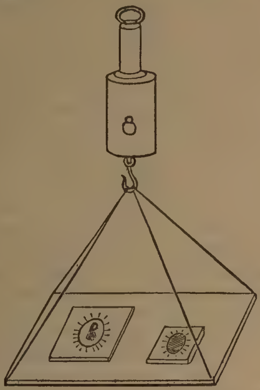


Put the whole thing outside the window on the ledge, pass stout string through the holes, B B, and fasten to anything in the room, to keep the boards from slipping out; the ledge at A A will prevent your

frames from sliding off, and the window can be closed on the board at B B, the hinges allowing it to be shut up when not in use, and stood in a corner out of the way.

VIGNETTING.

Buy, for a couple of shillings, a second-hand clockwork roasting-jack, but see that it is in good working order. Hang it in the shade, and from the hook at the bottom bring four stout strings to holes in the four corners of a board, say, 3 feet square.



Place the frames on it, wind up the jack, and the result will be a true vignette, soft and undefined, and vastly different from the great majority of *attempted* vignettes that one so often sees.

GREEN FOG: ONE OF ITS CAUSES.

By A. HADDON.

DURING the last few years green fog has become less common than it was previously. This can be explained in one of the following ways :—(1), That makers of plates now understand much better than they did the nature of the different chemicals with which they have to deal in the manufacture of plates. (2), That the materials used are purer. (3), That when the 'green-eyed monster' turns up, the makers prefer to lose a certain amount of cash by sending the recovered bromide of silver to the refiner rather than to risk their reputations as plate makers.

From what was said a short time back at one of the London photographic societies, it would seem that green fog is not an unknown quantity with some makers, but its non-appearance in public may be due to reason (3) given above.

When preparing emulsions on a small scale, I have almost invariably traced green fog to the silver, and nitrate of silver thus *tainted* cannot by ordinary treatment be made to yield plates free from green fog.

I was recently supplied with some nitrate of silver which, when converted into bromide, either in the presence of ammonia—*i.e.*, either by Mr. Henderson's cold emulsification process, or by the ordinary ammonio-nitrate method—or by boiling in presence of a trace of acid, always gave green fog. I then fused the nitrate and again tried it, but the results were identically the same. The fused silver was then dissolved in distilled water and crystallised, and on preparing emulsion with the silver, thus treated, no fog resulted. On trying a different sample of silver from the same firm, the gelatine, bromide of potassium, and ammonia remaining the same, no green fog showed itself; this to me, at least, proves that in certain cases green fog is undoubtedly caused by some foreign substance, and that not of an organic nature, in the nitrate of silver.

In the early days of gelatino-bromide plates the nitrate of silver, so we are told, was almost entirely a bye-product which was not, most probably, thoroughly purified by recrystallisation, hence a small percentage of *the foreign matter* in the nitrate of silver produced the large number of green-fogged plates sold. Now, when the demand for nitrate of silver has increased so enormously, it has to be specially made from pure silver or from an alloy, which when refined and then converted into nitrate is freed from the element necessary for the formation of green-fogged emulsion.

When green fog now appears it might most probably be traced to the employment of the bye-product nitrate of silver in the manufacture of the emulsion. If this point could be definitely proved, it would at once guide us in the selection of our silver nitrate.

Should I at any future time have the bad or good fortune to be supplied with silver giving green fog, I will endeavour to fathom the difficulty by having a complete analysis made of the sample of silver nitrate. I shall be glad, during the coming year, to read or hear any ideas of different people on the subject of green fog. A little of it is, according to some, a thing to be desired, but when the shadows are as red as ruby glass, very little is to be done with a negative thus afflicted.

LANTERN SLIDES FROM LINE ENGRAVINGS.

By William Brooks.

Making lantern transparencies from diagrams or line work of any description is thought by many to be very difficult. Having had considerable experience in slide making generally, I think a few words on this subject may be acceptable to the readers of the Almanac. I make all my slides on collodion emulsion, as I consider the results far superior in every way, giving perfectly black lines, and absolutely clear glass for the ground. A great many have an idea that complete opacity is required in the negative that the slide is to be made from; it may be so when gelatine is used to make the slide on, but with collodion a thin, clear negative will give a perfect result. The negative may be so thin as to be able to read the smallest print through any part of it.

Those who may require a moderately dense negative will get the best result by using a slow plate and a strong developer, taking care not to over expose. A little ale added to the developer will help matters considerably. If rapid plates are used, failure will sure to follow. After the negative has been fixed and washed, if required it may be strengthened

by either one of the mercurial processes. I prefer using liquid ammonia and water, a rather dilute solution, after the mercury. In my own practice I scarcely ever intensify.

I use for making the transparency a thickly coated plate (collodion emulsion). The exposure can either be made in the camera, if the negative be a large one and the image has to be reduced, or in contact in an ordinary printing frame, if the image is of the right size; the latter method is more expeditious. Any collodion emulsion can be used that works clean and bright. If the negative is a thin one a certain amount of reduction will take place on the parts that should be bare glass in the transparency, but this can easily be removed, as will be seen further on. Any suitable developer can be used. After the image is well out in every part, it is fixed with *cyanide* (not hypo) and washed under the tap; the plate is then flooded with a dilute solution of iodine, made by adding a few drops of the alcholic tincture of iodine to water. If too much of the tincture is added it will be muddy, and by adding more water it becomes clear, of a deep sherry colour. This can be poured on and off the film from a measure, pouring on at places where the fog or deposit requires to be removed; this fog will become opalescent, of a bluish tint. When this has taken place the plate is well washed, and flooded with the cyanide solution, which will clear it away and leave bare glass except where the lines are. Care must be taken not to go too far with the iodine solution and destroy the image. This operation can be repeated until the desired effect is obtained. The plate is again well washed; it then probably will require to be intensified, which can readily be done with pyro and silver. I prefer to use

Pyro	30 grains.
Citric acid	30 ,,
Alum	30 ,,
Water	15 ounces.

Take about two drachms of this in a clean measure (a white china egg cup is the best) and add to it one or two drops of a twenty-grain solution of nitrate of silver, pour on and off the plate; it will gain in intensity. Should this not appear to come up rapidly enough, wash off and apply the iodine solution for a few seconds, wash off, *not* using cyanide this time, and again apply the pyro and silver; intensity will be more easily obtained. When sufficiently intense wash off and place in a weak solution of

Platinum bichloride	1 grain.
Water	6 to 10 ounces.

This can be used over again until exhausted, which will render the lines an intense black, the ground remaining perfectly bare glass; it then only requires to be dried and varnished with a clear spirit varnish, and if these operations have been carried out successfully, the most brilliant result is obtained.

There is one thing that must not be overlooked, and that is, after the image has been developed, fixing and all the after operations can be done in broad daylight.

If gelatine plates are used when the plate is developed, it cannot be altered to give a satisfactory result after.

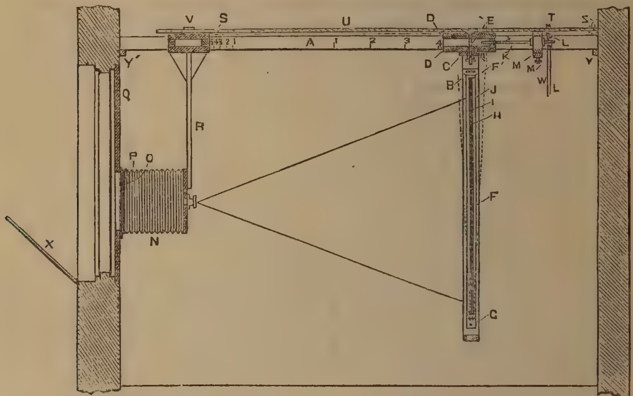
ENLARGING.

By Alexander Kellar.

Enlarging might possibly be very much more practised did it not, as at present arranged, demand far more room than the majority of people can spare. This is especially the case in amateurs' dark rooms. This was the case with myself until a friend (Mr. S. W. Allen, of Cardiff) gave me the idea hereunder explained. My dark room is only 8 × 5 feet, and the available space left for working, after deducting space for tank, &c., is 3 × 7 feet; notwithstanding this I can, by putting myself to very little trouble, expose and develop comfortably. It is quite evident there would be no room for a table.

This is not the only advantage, nor in my opinion the greatest. We all know the anxiety experienced if any one walks across the floor while the exposure is being made, thus shaking the apparatus and blurring the resulting picture. By fixing the supports to the walls this is overcome, and pattering feet may come and go without any orders to keep quiet, and the 'guid wife' again have one chance less to grumble at the 'black art.'

The apparatus is simple, and by following the explanation can easily

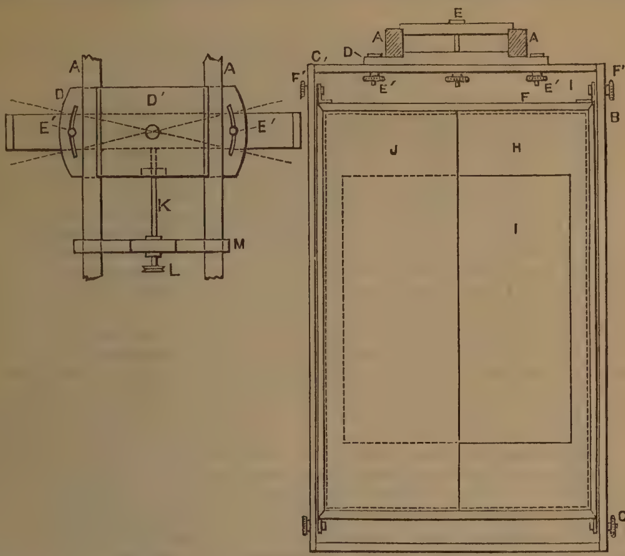


be manufactured. A A are two bars of wood, say, three inches wide and two inches thick, and the full length of the room, fixed to the wall by the supporting pieces, Y Y. B is a frame hanging on the bars by the bolt, E, and the clamps, D D. This frame can revolve on the centre bolt, E, and when in position be secured by the bolts, E E. The frame, B, carries an inner frame, F, which has permanently fixed in it a sheet of plain glass, H, as flat as possible and free from flaws; it also carries the ground-glass focussing plate, J, which is in two pieces, and can be fixed by buttons or springs. The frame, F, is fixed at the bottom by the screws, G, and at the top by the bolts and slotted plates, F F, allowing it to be tilted as shown by the dotted lines. The easel has, with the exception of a perpendicular motion, every desired adjustment; and as the centre line

remains constant this is not of much consequence, and the position which the paper must occupy can easily be marked on the ground glass and the paper set to the marks. This is simply done by removing one half of the ground glass, slipping the paper behind the other half, replacing the glass and clamping it up tight; the paper is then bound to be flat and in its proper position.

Having decided the number of times the negative is to be enlarged, the frame, B, can be set to within half an inch by the help of a table of enlargements, and thereafter adjusted to a hair's breadth by the adjusting screw, K, through the cord and wheel, L; the thrust of the screw is taken by the frame, M, which can be fixed by the set screws, M′. So much for the easel. Now for the negative, &c.

In the case of daylight enlarging, a shutter must be made with a hole about one and a half inches larger than the longest length of the negative and square, so that the negative can be placed in any position. On this



shutter is fixed a frame with a rabbet to take the carrier, O, which holds the negative, P; on this frame is fixed the bellows, N. Supported by the stays, R, and the clamps, S, working easily on the bars, A, to the clamp, S, is fixed the nut, V, which, on turning the partly screwed square rod, U, by the wheel and cord, T and W, the lens is brought nearer the negative, or away from it; the rod, U, is fixed to the wall by the collars and plate, Z, and has the wheel, T, sliding on it so as to accommodate itself to the frame, B

An old negative being now marked off, say, exactly at four inches, and a centre line drawn, the frame and the lens are adjusted until the desired enlargement or reduction is ascertained, and the bars marked, so that when any desired enlargement is wanted the frames are set to the desired numbers, 'and there you are.'

It may be easier to tack your paper on a drawing board, &c., and it is still easier to get your head in the way of the light, and very difficult indeed to see your picture when the lens is stopped well down and a dense negative in the carrier. Any one having once used the ground glass for enlarging will be very loth to go back to the drawing board dodge.

Should limelight or oil be used, the lantern can also be supported from the bars, making the arrangement entirely self-contained.

I shall not enter into the question of reflector, exposure, &c., this having been so often explained in the ALMANAC.

'I CANNA GET THEM TAE HAUD.'

By T. N. ARMSTRONG.

I HAVE chosen the above subject for my contribution to this year's ALMANAC, because I believe it touches upon a very common trouble, and I trust it may at the same time be of service in helping a number of workers of 'Eastman Films' to overcome a difficulty.

Another year has come and gone, and many, doubtless, are the opinions formed by those who have used these strippers. Some rejoice in being the happy possessor of a roller slide, whilst others, no doubt, are not just so well satisfied. My experience is all in their favour.

Some few months since, however, I met a clever amateur who had been exposing a few of them, and he had a sad tale to tell of his troubles, alleging that he was seriously thinking of selling his roller slide, just on account of the bother in finishing his negatives after they were developed.

On my asking him what was wrong, he said, 'I canna get them tae haud,' and so feeling rather curious as to what he really complained about and meant by this remark, I said I would look round at night and have a smoke. 'Do,' he said, 'and we will develop a few I have on my roller when you come round.'

The weather was beastly hot at the time, and I fancy the market had not gone just as my friend would have liked that day, for I found him in a beastly bad temper, puffing and blowing, in his shirt sleeves, using rather bad language, and again repeating, 'I canna get them tae haud.' I mildly suggested, 'Take it easy, old man, and light up a cigar, and let me have a try.' 'By all means,' was the reply; 'go ahead.'

Now, just when I happened to arrive on the scene, my friend had got as far as the skinning operation, and it was the putting on of the skins that bothered him. So, throwing off my coat, I took a fresh skin and stuck it on as easily as attaching a postage stamp to an envelope. A look of blank astonishment came over my friend's countenance. 'I have been trying the last ten minutes to do that, and you have managed it in ten seconds,' was his remark. 'Let me see you do another.' So I did another. Still my friend could not see where he was wrong, so simple did the operation appear.

Now, everybody knows what a squeegee is, and everybody knows what an indiarubber squeegee cloth is, but every amateur does not know the proper way to squeegee a skin to an Eastman film.

An indiarubber cloth generally has two different surfaces (the one I use, however, has not); one side cloth, the other rubber. Now, when squeegeeing the skin on the film negative, my friend placed the rubber side next the skin, with the result that instead of the skin sticking to the film it stuck to the rubber surface of the squeegee cloth. On my pointing out how simply he could put matters to rights, he confessed he should never have thought of it.

Just a word about the best sort of waterproof cloth to use for this work. The one I have is not a black rubber surface, but is what is known as dress-preserving cloth; it is nice and thin, and has a cloth surface on both sides. With such, a novice could not have fallen into the trouble my friend fell into.

THE MISSIONARY BOX.

By Thos. Gulliver.

We have a number of ladies and gentlemen call here who do a little in the way of photography as amateurs, very nice people in their way, and I greatly respect them, and very often I get some good orders from them for printing and developing plates; others come for advice gratis and to request the loan of a printing frame or two or a little sensitised paper, just to see the result of some wonderful effort of genius in rapid exposure, &c. To these last we have lately introduced a missionary box with a polite intimation that a small contribution will aid a good cause and assist in bringing the heathen to their duties. Since then we have not had so many visitors of this class.

STEREOSCOPIC PHOTOGRAPHY.

By B. J. Sayce.

'Survival of the fittest.' How often do we meet with this phrase, and if there be any truth in the doctrine it is certainly *fitting* that stereoscopic photography should survive. What delightful memories do these words recall to those whose privilege it was to see, in their pristine beauty, the Scottish slides of G. W. Wilson, the grand collections of Continental scenery by W. England, Ferrier, and Stephen Thompson; features of city life by Valentine Blanchard, and those gems of picturesque England by Francis Bedford and others. Many an hour spent over these has passed uncounted but will ever be remembered with pleasure, for there is magic in the penetrating power of the stereoscope; we are told of the intense interest with which an astronomer discovers new stars, and can enter into that feeling, for a like sensation is shared by the stereoscopist, to whom prolonged gaze through the binocular reveals fresh charms of scenery in what, in a single landscape picture, would be but a stretch of half tone, while also every leaf, branch, stone, rock, figure, aye! and cloud, cease to be mere copies and become reality to the senses. In portraiture, too, statuesque coldness is inspired by fire of life, such as no single picture

could possibly arrive at; but 'fashion rules the world,' and that fickle dame decreed some years ago that she had had enough of the pairs of photographs on yellow mounts in shop windows, then so familiar to passers-by, and, her fiat once gone forth, their places were occupied by *cartes* and cabinets of the 'professional beauty' type—a most tantalising craze I consider for a people to whom polygamy is prohibited. We then passed into the lantern slide period, and, by a very natural course of reasoning, it must have occurred to many that out of one stereoscopic negative, two lantern slides could be produced at one contact, and now we have the *renaissance* of stereoscopy. Old cameras are being looked up, lenses, long disused, receive their old affectionate polishing, and opticians may take heart that the favourite four-and-half and six-inch foci single lenses will once again be in demand, and another generation will be astonished at the vigour of negatives by these obtained. But in many minds the theory of stereoscopic relief is far from being understood, hence we occasionally find it gravely asserted that two prints from the same negative if mounted at the requisite interval of space between respective objects (usually from $2\frac{3}{4}$ inches to $2\frac{7}{8}$ inches) are as perfectly stereoscopic as though each were taken from a different angle of vision; as there are, however, some folk who declare that they cannot see through a stereoscope, this may throw light on their opinion.

I have alluded to the probability that lantern slide making is the indirect cause of returning interest in stereoscopic work, and if we consider how many negatives have those flaws which the amateur so easily explains, but are, nevertheless, fatal blemishes to his work, I see very strong reasons for taking two negatives of the same object on one plate, there being the chance that one, at least, will be right, and this alone may popularise the stereoscope with amateurs, while those who manufacture slides for the market will not regret the revival of a method which will give them two direct negatives of a subject in demand.

There is a great charm in developing a stereoscope negative, a kind of rivalry between the two pictures suggests itself in the mind of the operator, and watching their respective growth in intensity is as exciting to the true photographer as a competition on the turf to a racing man.

In conclusion, what I have written is well known to some, but I do not hesitate to believe that there are thousands who now produce photographs who have no stereoscope, and are practically ignorant of the startling effect of pictures viewed through it; to such I would say, Get the loan of a series of slides from a friend, you will be fortunate if he has any of those I have enumerated, and in the quiet of your own particular 'den' study them carefully and you will bless the art and the inventor of the instrument, Sir David Brewster, which place such enjoyment of nature's glories so easily within your reach.

A PLATINOTYPE EFFECT WITH ALBUMENISED PAPER.

By Henry Sturmey.

Few photographers there are who have not, at one time or another, in a moment of hurry or absence of mind, when filling their printing frames with albumenised paper, inadvertently put in a sheet the wrong way. The majority, however, on discovering their mistake, remove it

hastily and put in a fresh piece, consigning the 'spoilt' paper to the waste box, and it is quite the exception for any one to think of continuing the printing in such a case. Yet, by so doing, some very pleasing results can be obtained and effects produced, which, but for, perhaps, a slight graininess due to the substance of the paper, are almost equal to platinotypes. To get the best results with this system of printing, the negative must be a good one, and not in any way thin. The printing must then be carried on until all detail is out strongly on the matt-surfaced 'wrong side' of the paper; in fact, until the picture is as full and as strong as it appears possible to get it without destroying detail. It should then be washed in the usual manner, but it will be found that the shadows as the washing progresses will turn to a most disagreeable greenish yellow muddy colour. Washing must be continued until all the heavier shadows have assumed this tint, when the picture may be toned along with other prints. In the toning bath it will lose its unpleasant colour, and assume a purplish grey, which it retains to the end. This system entails very much longer printing, as the image has to get well through the paper, but it forms a pleasing variation in printing methods without any real change in working, and by wetting the albumenised side of the paper—now the back of the print—it can be mounted without the addition of any other mountant.

MY DETECTIVE.

By Mark Oute.

I got into a horrid scrape when out the other day—
I took out my Detective to while the time away;
I came upon a charming scene, down by the river side,
Where groups filled up the foreground, and boats danced on the tide.
A glorious place for pictures that, and I had taken one,
Then preparing for the second, I had not well begun,
When a *Bobby* watching me out from the crowd there came:
'What are you up to with that box, what is your little game?'
He gruffly growled, and then he scowled, as he put out his hand;
But to give him my Detective was a thing I could not stand.
'This is a camera,' I said, 'for taking photographs;'
At this he winks his bloodshot eye, and then he loudly laughs.
'Come, hand it out and show me, or by the canny Scot
To the station house along with me in double time you'll trot!'
''Twill spoil my views,' I gasping cried. 'I can't show you the box.'
'Come, none of your palaver—the blooming thing's a hoax;
It's a clockwork toy that you'll employ, whene'er you get the chance,
To blow up the Grand Parade, and make the people dance;
So, my fine swell, just hand it out, and let me see what's there;
We can't do with more dynamite—we've had enough o' scare.'
'What do you mean?' I cried, as moving on, still clinging to my case,
I sought way through the yielding crowd to try and leave the place;
But *Robert* would not have it so, he closely followed me,
And calling out to halt at once, resolved the box to see.
'I will not let you see the case,' in anger I exclaimed,
'For the reasons I have given you,' and further I explained

That all the plates would wasted be, e'en if he looked with care:
'Then you must to the office come, and see what they say there.'
So through the streets by *Bobby* I was trotted right along;
A 'Hansom,' I suggested—that was coming it too strong.
He would not have no carriages—on foot I'd have to trip,
He would not let me have the chance of giving him the slip.
At length we reached the office—I flurried, hot, and wild;
His worship, who was sitting there, looked down on us and smiled:
'Well, who's the party?' mildly asked. 'For what is he brought
here?'
The *Bobby* then preferred his charge in accents loud and clear,
'Obstruction of the passage, sir—A blocking of the way!
A carrying a suspicious box! Its contents wouldn't say!
I demanded for to see it then, 'twas dynamite, I feared,
At that he dived into the crowd and quickly disappeared;
I caught him up and held him fast, then brought him right along,
So now your worship can decide if I did right or wrong.'
'You hear the charge,' his worship said, 'what have you got to say?
And if you nothing had to hide why did you run away?'
'I feared,' I quick replied, 'that my Detective he would take,
And not knowing its construction unwittingly would break
The apparatus delicate—that he could not understand;
But now I pass it up to you—pray take it in your hand.
I can the box but open when in a Ruby Light,
The contents would be ruined by anything more bright;
Procure dark room and such a light, and then I will undo
The box and inside fittings and present them to your view.'
'I know this little article,' the Judge with smile replied,
'A handy little camera that I have often tried.
So, officer, there is no charge, the prisoner is free:'
And then the *Bobby* walked away, not feeling sure of me.
'I regret your day's been lost,' his worship said, and then
He carefully handed me my camera again.
'It is a very *taking* thing, but I would have you note
In arranging views,' he smiling said, 'choose you some private spot,
Although exposures is your aim—and you're sure to have your man,
When you chance to see an officer, you tell him all you can.
May you have many photo days,' said he, in suavest tone,
'Without your being taken up, when you are taking on.'

USEFUL ACCESSORIES.

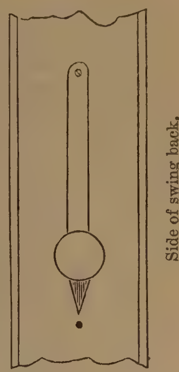
By Wm. Whitehouse.

A Simple View Meter easily made, for any one can make it; the material costs nothing, for it can be found in every house; it can be used in any position, and is not likely to attract attention in crowded streets as other forms are, and will suit one or any number of lenses, occupies practically no space, and may be useful for other purposes.

Take a piece of string about four feet in length, and, having focussed a view with the camera, hold a short length of string at arms length between the tips of the fingers and gradually lengthening until the

height of field of view seen is equal to that seen on focussing screen; tie a knot in string at that point and then increase length of string until equal to length of view; then tie a second knot; do this for each lens, commencing with the one of shortest focal length. On holding the string again between the tips of fingers and looking at any view, the position may be chosen or lens selected without further trouble.

A graduated tape measure, costing 2*d.*, may be used instead of string, notes being made in exposure-book as to length of tape held between fingers with each lens.



A Simple Plumb Bob or Pendulum for Levelling Camera.—Almost any one can make and fit an arrangement as described below at a cost little more than that of the view meter mentioned above. Cut a pendulum-shaped piece of brass or other metal like adjoined sketch and attach to side of swing back of camera by a screw fitting so as to allow pendulum to swing loosely, putting a washer of card or metal between to prevent it catching side of swing back. Level the camera back with a spirit level or plumb line and make a dot on the swing back exactly opposite point of pendulum. The back is afterwards always vertical when point of pendulum is opposite dot. The pendulum may also be fitted to a loose bit of wood with square edges and carried about in pocket, but it is better fitted to the camera.

SIMPLICITY IN APPARATUS.

By Thomas Samuels.

It is generally admitted that great progress has been made in the artistic finish of photographic portraiture. The simple accessories now adopted have contributed greatly to this result, as may readily be seen by comparing the leading pictures of the present day with those of bygone times. The simplicity of the dry plate has done much more towards this satisfactory position, for the artist being freed from the preparation of the sensitive plate, and relieved from all anxiety with respect to the keeping qualities, is now able to concentrate his study upon the production of pictures that may be submitted to art critics without misgiving. This success has been achieved by professionals and amateurs also, with the original apparatus of their studios. But it is doubtful whether landscape work generally has progressed as might have been expected from the introduction of the dry plate. Ease of production chemically has certainly led to quantity, but too much of the work is mechanical, showing little evidence of study for pictorical effect. Is not this due in a great measure to the erroneous impressions that prevail concerning the means of production?

Accepting as facts the various statements to be found in advertisements, the aspiring amateur might reasonably conclude that it is only necessary to have an apparatus embracing all the points thus brought to his notice to ensure the production of successful photographs. But in practice many of these contrivances would be found unnecessary: some

distracting by their complexity, and others useless for the ordinary worker. Some causes that have led up to this may be referred to:—The fallacy that the swing back is the only method of obtaining parallel lines in architectural subjects, whereas identical positions may be obtained by moving the lens mount, thus leaving the heavier part of the camera rigid. The 'no loose part' idea—perfectly right applied to small fittings, like screws—but wrong when it leads to the construction of square cameras for oblong pictures, thus increasing the bulk and adding a somewhat dangerous fitting—the reversing back—or the complicated attachments of the focussing glass recently introduced. Retaining the book form of double back (first constructed for the calotype process), when the solid back is more simple without the dangerous middle joint. Disregarding the tripod stand as a part of the camera to be used upon it, has led to fittings which a judicious use of the stand might supersede. Providing bellows beyond requirements with intricate baseboards to extend them gives much unnecessary trouble, besides adding extra weight to be carried continually. The focussing arrangements, too, may be much simplified by adopting a scale for each lens in use, and at the same time ease the operator of a trying and often misleading operation. The *multum in parvo* endeavour has made some cameras a perfect maze of brass fittings, whether open or closed. Other causes might be advanced respecting lenses, exposure scales, and instantaneous shutters, all tending to make outdoor practice a mechanical task, instead of it being a pleasant relaxation for the tourist, or an aid to the artist. The introduction of detective cameras may help to cure some of these defects since their special charm is simplicity. But it should not be suggested that they may be used promiscuously without mental effort and good pictures be the uniform result, nor is it necessary, as you, Mr. Editor, have frequently pointed out, to encumber them with finders, levels, or such-like adjuncts. With them, as with all equipments, the degree of success will be in proportion to the study and skill brought to bear upon the work in hand. Therefore, we advise all who aspire to produce real pictures, first, to formulate a definite scheme for the work they intend to cultivate, and then to adopt the most simple form of apparatus that will meet their requirements.

EXHIBITIONS AND OTHER MATTERS.

By Fred. W. Dew.

In response to the Editor's request for a contribution to the Almanac, I have decided to give you a few ideas that I have thought may prove of interest, though perhaps lacking originality, and also a few notes from every-day experience.

I was much interested in Rev. F. C. Lambert's paper on 'Regulations for Exhibitions,' read before the Camera Club some few months since. The discussion to which it gave rise, and the ventilation of the various ideas on the subject, must do much to improve the state of affairs. It is to be regretted that the photographic world has no such bodies as exist in the cycling and athletic worlds, under whose regulations all competitions could be held, but at the same time it is to be hoped the time is not far off when such a regulating power will be created. There are two points

which appear to me to have escaped notice. The first is the desirability of grouping together (as far as possible) the contributions of each exhibitor. Not only is this useful for purposes of comparison, but it saves the spectator who wishes to study the work of a certain artist (and there must be many who go to an exhibition for that purpose) a great deal of wearying running to and from the scattered frames. I know that it is almost impossible with varying sizes of frames and the exigencies of wall space to carry this out entirely, but in cases of exhibitions of the work of the members of one society, and in similar cases, I think this should certainly be one of the regulations, and I am sure the general public would appreciate it if done.

The second point I recommend more especially to the secretaries of exhibitions; it is an easy way of securing an authentic and lasting record of an exhibition by means of photographs taken from different parts of the room. It will be found that they will possess considerable interest, and that exhibitors will gladly avail themselves of the opportunity of obtaining mementos of the exhibition. I do not think this has ever been done by others, in which statement I am supported by our editor, to whom I recently had the pleasure of submitting some photographs of the exhibition held in Coventry in October last.

Washing Soda Developer.—For landscape work I much prefer this to any other developer, and several friends who have made a trial of it at my suggestion have all declared in favour of it. I use the formula recommended for the Derwent plates with this slight modification, that the soda solution is mixed up double the strength given in the formula, and it can then be diluted as the exposure, subject, and class of negative desired may require. I have succeeded in obtaining bold, vigorous negatives, showing every gradation of density with this developer, while on using the same plates with other developers I have not been able to get sufficient density in the negatives to give anything but weak, flat prints. I do not claim that it is a perfect developer, but it is both simple and economical, as the same solution may be used for two or three plates.

Backing Plates.—By far the simplest plan I know of for this purpose, where an extraordinary amount of halation is not anticipated, is the use of a piece of American cloth of the same size as the plate squeegeed into contact by means of some adhesive subtance. Glycerine is recommended, but strong starch will answer every purpose. I do not know where I saw the above 'dodge,' or whom to thank for it, but I have found it uniformly successful, and would advise those who wish for a simple and expeditious plan of backing plates to give it a trial.

Now, as the editor must have more pressing demands on his space, I must take leave of my subjects, hoping that the critics of this article will, 'as they are strong, be merciful.'

A NOTE ON VIGNETTING.

By F. W. Treadway.

I very well remember when I first 'went in' for photography what a unique pastime it seemed to me to be for melting any surplus pocket money one might have; there was always something wanting, always something that would come in useful. One has to buy experience, and

I could now mention many pieces of apparatus that are 'on the shelf' for good, among which 'vignetting glasses,' as it may be news to the tyro that these are unnecessary luxuries (?).

It will be found that better and more graduated vignettes can be got by using pieces of brown paper or cards the size of the printing frames with suitable shaped openings, cut with serrated edges. These should be fixed outside the printing frames, and the printing must be done in the shade unless tissue paper is pasted over the openings, in which case it can be done in full sunlight.

Now for the way of fixing the vignettors on the printing frames. This can be done with drawing pins, indiarubber bands, or they can be glued on; but the hint I wish to give is to use the plan adopted by the London General Omnibus Company for fixing the way-bill on the door, namely, make a frame from a thin piece of wood (cigar box will do) and hinge it on to the printing frame, and on the opposite side put a hook and pin, and the thing is done. This will be found a convenient plan, as the cards can be shifted easily, and there is no chance of light getting underneath.

ITEMS IN THE TECHNOLOGY OF DEVELOPMENT.

By E. Howard Farmer.

In constructing a theory, or basis, for guidance in development, it is essential that not only the functions of the constituents of the developer are known, as well as the modifications produced by different proportions of ingredients, different times of development, &c., but that the nature of the subject to be developed as regards the contrasts of light and shade, the exposure, the class of film employed, and the class of negative required, are considered also.

We will take as an example cases of strong and weak contrasts.

Photograph a lady in a dark-pattern dress, with a child in long clothes in her lap. No difficulty would occur in taking either the lady or the child separately, but together a difficulty at once arises. There is either too much light reflected from the child's clothes, or too little from the lady's dress, whichever way the operator is inclined to put it. If an exposure is made for the child the dress will be nowhere in the plate, or if an exposure is given for the dress the child will be buried in density and over exposure. Or take a person out of doors, with the figure half in sunlight and half in shadow; or an interior, with a portion in strong light, and another portion in comparative deep shadow, including, perhaps, some bronze figures in the shadow portion. In these cases we have examples of subjects containing, from a photographer's point of view, excessive contrasts of light and shade.

You require to obtain a bright copy of a faded print, and a difficulty of a different nature will occur. From the discoloured state of the paper it is, photographically, almost as dark as the ink or pigment itself, and whatever exposure is given to the plate, a dark and foggy image results. Or attempt a distant view under the usual conditions of lighting and atmosphere found in England, and a similar foggy image will be obtained. These are examples of insufficient or weak contrasts of light and shade; examples of both types might be multiplied indefinitely.

Taking, for the moment, subjects with excessive contrasts only, a

film will be used which *has not a weakness for halation.* The first correction will be made by giving as full an exposure as is consistent with getting a bright image. The subsequent corrections, and those with which we are more immediately concerned, are to utilise the effect of modifications in development.

If a finished negative, representing a subject with full or excessive contrasts, and developed in the usual manner, be examined by transmitted light, it will be found *free from deposit* in the deepest shadows, and will, therefore, be practically bare glass in these shadows. Commencing from these transparent portions there will be gradually increasing quantities of deposit, or increasing degrees of opacity, more or less, in proportion to the different quantities of light which have fallen upon the plate from the different portions of the subject represented, until, where the brightest details are outlined, there will be complete opacity to any moderate amount of light. By definition this complete opacity will be such, that if a piece of sensitised paper is placed in contact with the negative, and exposed to daylight for a sufficient time for the portions of the paper under the clear parts to become as dark as the paper can be rendered, then the paper under the opaque portions, but only under the opaque portions, will remain white, or only be *slightly* tinted. It is evident that as the darkest parts of the paper cannot be rendered any darker, or the white parts any whiter, we have in a print from such a negative the greatest possible difference between the extreme high lights and the deepest shadows. *If the subject was one which was correctly exposed, &c., and in which the high lights and the deepest shadows are small compared with the size of the picture, and they do not abruptly run into one another, but only through gentle intermediate gradations of half tone, then, although there is the greatest possible difference between the high lights and the shadows, there will be no appearance of excessive contrast.* But if there are large masses of high light or shadow in the subject, producing corresponding masses of opacity and transparency in the negative, and especially if these masses of light and shade are in proximity with one another, there will be, in all probability, the appearance of excessive contrast, or, as it is graphically called, 'chalkiness,' both in print and negative.

Suppose, now, in the case of the chalky subject, the development is stopped at an earlier stage; that is, before the high lights have reached complete opacity. All parts of the finished negative will now have less density than in the previous case, and the negative will appear altogether thinner. There will be also a great diminution of the excessive contrasts, or chalkiness, for as none, or only minute portions of the high lights are opaque, the huge patches of white will no longer appear in the print, but instead of them delicate shades, showing a host of details before invisible, and softening the whole image.

The second correction therefore, made in the case of excessive contrast, is to stop development at an earlier stage as regards density, so that a thinner negative is obtained.

It may happen that there will be a loss of some of the details in the shadows, as the development has not been long enough to bring them out, and this brings us to the third correction.

It is a function of ammonia—and a most important function—to accelerate development, which means that it develops, or brings out, the

details of an image more rapidly in proportion to the quantity present—between certain limits—so that it is possible to get all the details of an image during development by adding more ammonia long before sufficient density is obtained. In such cases the *whole image* goes on getting denser if it be kept in the developer, and ultimately the shadows are rendered much denser in proportion to the high lights than they would have been had the high lights been rendered dense before bringing out the shadows. On printing from such a negative, the shadows, being denser, are rendered lighter in the print, and again the contrast is reduced, and the whole picture softened and subdued.

The third correction is, then, to develop the shadows of the subject; by adding ammonia sufficient the density is obtained, and to get density afterwards.

A fourth and last correction, as far as development is concerned, is to reduce the proportion of pyrogallol, for as the increased quantity of ammonia, besides accelerating development, will also exercise the same function as more pyrogallol, *i.e.*, give more density, there will be a tendency to get too much density in the high lights. To compensate for the disturbing action of the ammonia less pyrogallol is used.

As excess of soluble bromide tends to give increased contrasts, *no more* is employed than is sufficient to prevent fog.

To turn now to subjects which lack full contrast, and which tend to give weak images, we cannot do better than take as an example a faded print in which there is very little difference in the amount of actinic light reflected from either the discoloured paper or the faded pigment. Many photographers consider it impossible to photograph such subjects as these successfully by means of the gelatine process, and habitually employ wet collodion plates for the purpose. While there is no doubt that such subjects are more easily rendered with collodion, with a little care and suitable development they can be rendered just as successfully with dry plates.

The first correction is to give as short an exposure as possible, so that the difference in chemical effect produced by the different portions of the image on the sensitive plate may be as great as possible. The second correction is to prolong development until the high lights are rendered completely opaque, and as the minimum exposure has been given this density will be much more difficult to obtain than in the other cases we have been considering. Supposing that the shadows could be kept perfectly clear, it is obvious that the vigour and contrasts of the image will go on increasing until the high lights are rendered quite opaque.

The third correction is by using as small a proportion (not necessarily a small total quantity, but small as compared with the pyrogallol and bromide present) of ammonia as possible, to retard the development of the shadows until the last possible moment. The clearer the shadows are kept the darker will the print be in those places, and the greater the contrast.

The fourth correction is to use the maximum quantity of pyrogallol that will give additional density with the quantity of ammonia used, such excess of pyrogallol, while giving more density to the high lights, helping to retard the development of the shadows.

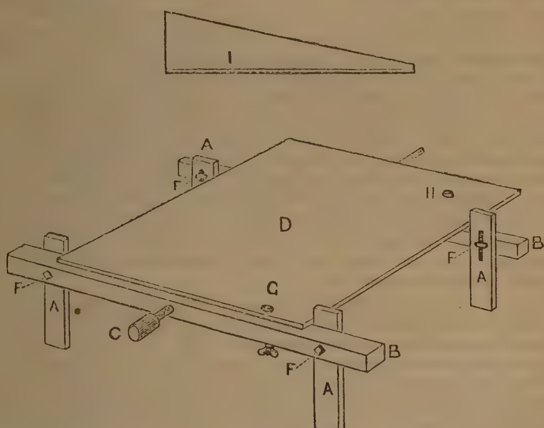
The fifth correction is to employ an excess of soluble bromide, which will still further restrain development, retain the clearness of the shadows, and allow the high lights to be rendered denser.

In making these extensive modifications in the developer, for the extreme case we are taking as an example, the time of development will be very much prolonged, and may be an hour or more. It may not be possible to obtain a perfect negative, and therefore print in such a case, but the print should certainly be much brighter and better than the original from which it was taken. In less extreme cases, obviously only one or two of the modifications mentioned may be necessary to accomplish the required correction.

A WINDOW CLIP FOR CAMERA.

By Thomas Gulliver.

I send sketch and description of a new form of camera clip that I have found very useful, and one that can be easily made and at very little outlay. It is all made of five-eighths of an inch pine, and strong enough for a 12 × 10 camera.



H. Hole for Camera Screw. A. Winged Nut Screw, 3½ inches. I. Wedge to tilt Camera. G. Screw and Winged Nut to fix Camera Table on to B. C. Wood Screw, 17 inches long. A. Four legs, 7 inches long, 1¾ inch wide, ⅝ inch thick. B. Two Cross Pieces of Hard Beech to carry the Table D, and Screw C. F. Four Screw Nuts and Bolts, 2 inches long. D. Table to carry Camera, 13 inches long by 7½ inches wide.

The wooden screw, C, passes through B B, and fixes on window-sash or window-sill, wall, railings, or anything within fifteen inches wide. The back legs are slotted for three inches, to allow of tilting if required. The wedge, I, is for tilting the camera sideways. The winged screw, G, allows of a little movement right or left should such be required. The camera screw being long allows the wedge to be used for side tilt; the back legs being slotted and rather longer than the front ones will give an upward tilt, which is sometimes useful.

The four screw bolts with square nut can be had at any ironmongers. The two winged nuts and bolts can be had from the camera makers. If the screws are taken out it packs into a convenient flat parcel for travelling.

LANTERN NIGHTS.

By Edgar Clifton.

There is at the present time such a multiplicity of photographic societies, and their lantern shows have proved such an attractive feature, that it may fairly be presumed that a few remarks anent such exhibitions will be of interest to a goodly proportion of the readers of the Almanac.

'Society' lantern shows have but little in common with the 'Grand Stereopticon Entertainment' which is given for the benefit of the laity, who are supposed to be mainly interested in the subject illustrated, and are not critical as to the technical perfection of the slides, and are satisfied if a very moderate amount of skill is displayed in showing them. In a 'Society' lantern audience every transparency maker is a critic, and naturally feels aggrieved if his slides do not appear at their best. It is, therefore, with a view of averting a certain amount of the odium which is not uncommonly cast upon the unfortunate being who has to work the lantern that the following suggestions are put forth.

Warm your Slides. One of the most serious troubles to be contended with in what may be called 'scratch' exhibitions—that is to say, where the slides are brought into the room and exhibited forthwith—arises from the difference of temperature of the slide and the atmosphere in the immediate neighbourhood of the lantern. Many times has the writer been accused of having a bad light when the dull and sunken appearance of the picture has been due to a film of moisture on the slide, which has almost been equivalent to a ground glass backing. All preliminary polishing is for this purpose useless, the condensation taking place *after* the slide is placed in the carrier.

A slide box with a perforated metal bottom, which would allow warm air to pass between the slides when placed near a fire or other source of heat, would probably do much to mitigate this evil. Where no such special arrangement is adopted, the slides should, before leaving home or office, be well warmed, packed together in close contact, and snugly wrapped in several thicknesses of flannel, only unpacking a few moments before they are actually to be put in the lantern. An air-tight box well padded with wool, after the fashion of the 'Norwegian stove,' would keep slides warm enough for exhibition for many hours.

Choose Glass of fairly Uniform Thickness. It is a severe tax upon the operator to expect him to focus every picture shown, often 200 to 300 in succession, because the pair of glasses composing the slide vary from less than one-eighth to nearly a quarter of an inch in thickness. In most cases the lantern objective is a portrait lens working at full aperture, and unfortunately possesses little, if any, of that much-disputed quality called 'depth of focus.' Very thin slides are worse in one respect, the liability to 'jam' when used in a 'push-through' carrier, than very thick ones; for while the latter can usually be forced through, the former become firmly wedged by overlapping, and necessitate the removal of the carrier, thus exposing the operator to the charge of clumsiness.

Mark your Slides. Every lantern slide has a front and back, besides four edges. Therefore, if the operator cannot at the instant of inserting the slide thoroughly understand the picture the chances are seven to one that the picture will appear in a wrong position on the screen. Most commercial slide makers have arranged that a label or title should in their own productions indicate the position of the slide in the lantern. So far there has only been one standard mark proposed, and it has now been adopted by many professional as well as amateur slide makers. It was first agreed on by a committee of the Photographic Club, and is now pretty well known, in London at all events, as the 'Club mark.' It is simplicity itself: the slide is held up to the light, so that the scene appears as in nature, and two small white paper dots, one-eighth of an inch or so in diameter, are then affixed to the face of the slide near the top edge. When the slides are inserted in the carrier these dots are placed downwards next to the condenser, thus avoiding much vexatious inspection of the slide in semi-darkness, which, after all, often results in a slide being inserted sideways.

After a Society lantern show the slides have to be sorted out and returned to the various contributors, a task of no small difficulty when they are all bound with black paper. There is no virtue in black paper, and every slide producer should choose a distinctive colour for binding his slides; besides all the plain colours, there is a host of marbled papers as used by bookbinders, while the cloth used for book covers would afford a most durable binding for slides which are to be much used. At the close of a meeting, the weary exhibitor is much more pleased to hear an exhibitor say, 'Please give me my slides, they are bound with bright green,' than, 'Just let me look through the slides, and I will pick mine out,' while perhaps half-a-dozen others are waiting for the same purpose. *Verbum sap. sat.*

FLASHES.

By C. Brangwin Barnes.

Notable among the additions to the photographic art during the past year is the magnesium flash light, and if I may be allowed to prophecy—but no, I will merely state it as my opinion—that when the next number of the Almanac is issued, the 'flash light' will have been much improved and the lamp will be found amongst the varied apparatus in nearly every studio. One of the most important facts in connexion with the flash light is the great aid it becomes to the photographer on a foggy day, or even at the close of one that has been bright. Say what we may, sitters will persist in calling when there is practically no daylight left, and now that we have the flash lamp we need no longer send them away untaken, nor need we go through the formality of posing, &c., with no plate in the slide.

The flash light acts splendidly in conjunction with fading daylight, and for that use alone is well worth its cost. When used at night it will be found necessary to have a good amount of gas or lamplight in the operating room, as the flash of the magnesium is otherwise likely to cause the sitter to close the eyes at the moment of exposure. Ground glass or tissue paper between the light and the sitter tends to soften the definition

and to render the shadows less harsh, though in some cases broad shadows add to the effect.

In developing, the pyro should always be kept at a minimum until all the detail is out, and it will be found in practice that the best results will be obtained on plates of ordinary rapidity.

JOTTINGS.

By Hugh Brebner.

The British Journal Photographic Almanac is nothing if not practical, and I—*I* must contribute

* * * * * * * * *

Hinc illæ lacrimæ! ('*' = *lacrima.*)

One or other of the following jottings, from my note-book for 1887–88, may, however, benefit the worker, interest the thinker, or amuse those who are neither.

The 'Arena' Vignettor.

A thin wooden box with a ground-glass bottom—ground surface down—with a rim or rebate below to loosely fit a printing frame, together with a sufficient quantity of sand, forms the entire machine.

To use. Slightly moisten the under surface of the glass, and having adjusted it over the negative in the printing frame, pour on the sand and rapidly arrange it while the glass is still transparent so as to give a vignette of the required form. Examine by lifting the box bodily from the printing frame; alter the shape of the vignette, if required, or tap the box to reduce the size without altering the shape. If a portion of the negative prints too quickly, cover it with sand. If a portion prints too slowly, wet the under surface of the glass just above the part. When the vignette is finished, pile the sand into the centre and tint the margin of the paper. By this means the maximum of artistic individuality of treatment can be obtained with the minimum of trouble. With large negatives the effects are admirable, similar to the broad, soft, cloud-washes applied to opals by hand.

The objections are three. The apparatus must be horizontal, cannot be used out of doors in a gale of wind, and should not be put into the hands of a careless or clumsy printer.

To Obtain a Negative from a Negative by Development.

Expose, say, an Ilford ordinary plate under a perfect but 'thinnish' negative at about six inches from a No. 3 Bray burner gas flame for about forty-five minutes. Develop with—

Pyrogallol	4 grains.
Ammonium hydrate	1 to 2 minims.
Water	1 ounce.

Bromide may be added if desired or required. It will be difficult to see the progress of the high lights through the slight fog, so it is advisable to use a slow developer, though a normal one—pyro or iron—will give good results. When placed in the hypo examine by white light. By a

judicious balancing of the exposure and development negatives should be produced thus, which, though taking somewhat longer to print than the original, will produce an equally perfect picture.

To Obtain a Reversal where the Plate has been greatly Under Exposed.

Expose in the camera, and attempt to develop with an iron developer of the maximum strength, and just before the high lights (first points to attract silver) begin to appear, add as much of a concentrated solution of hypo as will not fix the plate. A red image, positive, abounding in detail even in the deepest shadows of the subject will soon make its appearance. The great difficulty is to know exactly when to add the hypo, as, if the high lights are allowed to come out at all under the first treatment they will exhibit a degradation (bluish grey) on fixing. For the above reason I do not believe in sodium thiosulphate as an accelerator as occasionally recommended.

To get Coral Tones on 'Alpha' Paper.

Expose to the gas flame from a No. 3 Bray burner, at about six inches off, for from two to seven minutes, according to the density of the negative employed. Remove, wet, and develop with a developer approximately,—

Potassium oxalate, saturated solution	52	minims.
Ferrous sulphate, saturated solution	7	„
Water	365	„
Potassium bromide, saturated solution	2 to 4	„

Arrest development before the print is quite up, and it will be found advisable to develop slowly, to occupy, say, from four to nine minutes over it. The prints should fix a strong orange yellow, without a trace of brown, in which case they will dry to a fine pure red or coral colour.

UNSATISFACTORY PHOTOGRAPHS AND HOW THEY ARE PRODUCED.

By Herbert S. Starnes.

During the last few weeks I have been overhauling my stock of negatives, I found some of them good, but the bulk of them while having some good qualities, yet from some cause or other there was something wanting to make them perfect pictures. I therefore decided that a careful examination of them would teach me a number of lessons as to what to avoid in future. I found that the bulk of these semi-failures were due to errors in the amount and place of the high lights and deep shadows, and in many cases that it was really due to this cause, that from first appearances I had put down to errors in exposure.

On looking through our Photographic Exhibition, or any other collection of photographs, it will be found that the pictures that instantly attract our attention are those having a proper balance of light and shade. From a technical, I might almost say from a photographic point of view (such as sharpness of detail, &c.) they are often inferior to dozens of other photographs alongside of them, and even in composition and in the balance of lines they are often no better. On careful examination it will

be found that the whole of their success is due to the proportions and strength of the light and shade in them.

It is the same with the work of individual men. If we ask the most successful exhibitors at our exhibitions, whose photographs always seem to be works of art, we shall find that they use the same plates, the same developers, and the same printing paper as ourselves; indeed, they often seem to be less careful than others on these points. What, then, is the secret of their success? Simply this, that they have made a thorough study of light and shade and its correct representation by photography.

If those who think that it must be due to some special plate, or a secret development formula, would only spend one quarter of the time (to say nothing of the expense) that they give to trying different makes of plates, or developers, in making a study of chiarooscuro, they would be surprised at the improvement in the quality of their work.

One of the easiest and quickest means of doing this is, I think, when we see a picture which pleases us, to make a small copy of the light, shadows, and half tones, without any attention to the drawing. With two or three crayons and a stump this can be done in a few minutes. Then by carefully studying these copies and applying the rules that govern them to the selection of subjects to photograph, one will soon learn what will make a satisfactory picture and what will not.

In the early days of photography the public were fascinated by the sharpness and wonderful representation of detail in a photograph, compared to the often crude drawing of most of the artists of that day, especially in landscape work. But those days are over, never to return; and while photography has been the cause of the public demanding more attention to form and correct drawing from our artists, at the same time it is demanding from our photographers more artistic work, especially in regard to chiarooscuro.

NOTES ON 'ALPHA' PAPER.

By J. J. Acworth, F.I.C., F.C.S.

At the Exhibition this year in Pall Mall, I noticed a couple of enlargements on Alpha paper. I need say nothing further in criticism about this exhibit than that the colour of both is a kind of inky grey, so different from some of the beautiful tones Alpha is capable of giving. These pictures, besides doing service in finding a subject to say a few words upon for the Almanac, remind me, at the same time, of some similar experiences of others which have come before my notice lately, in which the sole endeavour seems to have been to produce a tone as nearly alike bromide as possible, often with failure as a result.

Now, as far as I know, the principal object in introducing Alpha, besides rapidity in printing, was to give a paper which would give all or more than the range of colour which can be obtained with sensitised albumenised paper, and, as far as my experience goes, the results do not belie the promise. This brings me to another point, and that is, Alpha paper is now somewhat more rapid than it was some time since, and as a result of this, under exposure and forcing in development will never produce satisfactory results; at the same time the results which can be

easily obtained by giving proper exposure and development leave nothing to be desired.

In an article by myself, published in THE BRITISH JOURNAL OF PHOTOGRAPHY, February 23, 1888, entitled 'Experiences with Alpha Paper,' I stated that to produce warm tones similar to those of albumenised paper, the print, after leaving the developer, or rather clearing solution, should be of a pinky violet tint; this is the most important part of the process as regards the finished result. If the development has not gone too far, *i.e.*, the pinky violet stage has not been passed, the clearing solution will be most active in reducing it, the action being a kind of *undeveloping* the print, and so regular and continuously will this go on that if the print be left long enough the developed impression will be gradually and entirely *undeveloped* or bleached away, the print assuming a series of tones in the reverse order of that of development. If the pinky violet stage of development be passed, then the clearing solution has very little reducing power, and if over exposed the finished print must necessarily suffer. Of two evils it is best to under develop slightly, and not go beyond that which I have described as a pinky violet stage. Supposing the print to be considered after clearing (when the clearing bath may have 'retrograded' the print too far) to be without sufficient 'density,' nothing is easier than in *full gaslight* to place the print again in the developer, watch it closely until judged correct in tone, then again clear and proceed as usual. This little trick may make and save many a print which would not otherwise be considered a success.

Another point I might touch upon, and that is with regard to the introduction of alum into the combined toning and fixing bath. As far as my later experience goes, alum is practically unnecessary; it increases the time required for toning certainly, and I fancy has a decided bleaching action. The former action would of itself be of no great importance, especially when using a new bath, when the whole process occupies only four or five minutes, but the latter is decidedly objectionable.

With reference to dark-room illumination, the mistake is always in using too little light to work by. The best illuminant is gas, using oiled 'canary' medium for filtering it. Without *plenty* of yellow light (not red or orange) it is difficult to succeed—with red light, almost impossible. Of two evils, working with a naked candle flame or ruby light I should choose the former by preference, for once the print is in the developer the naked light would do little harm.

A BROKEN NEGATIVE.

By Rev. A. JOHNSON, M.A., F.L.S.

I HAPPENED to be taking the first proof of a negative which could not be replaced, and which represented a subject of very great interest. On raising the printing frame I let it fall, the glass breaking into many pieces. The paper positive was a beautiful one, full of detail, but so underprinted as to make it certain that the reduction consequent on fixing would render it worthless. I therefore took the print, unfixed as it was, rubbed vaseline into the back until it was transparent, and then made a negative by contact on a gelatino-bromide plate. After washing and developing, I found, to my delight, that I had obtained an excellent

repetition of my original negative. The contact of the paper with the film had been so short that neither the grease nor the free nitrate of silver had left any traces behind them, as I feared would be the case.

A DISASTROUS FAILURE, AND WHAT CAUSED IT.

By William Cobb.

That disastrous results may arise from least suspected and apparently trivial causes, the following incident, which occurred but recently, may serve to illustrate. A well-known photographer—who, on this occasion, shall be nameless—received an intimation that on a certain day his services would be required for the purpose of taking a large group, the time and place being there and then fixed. Of such importance did he regard this commission, that he requested his plate maker to supply him with plates from a specially good batch for this very special occasion. But what a piece of presumption was embodied in such a message; as if the productions of that particular maker could ever possess the charm (?) of variation, or be anything but 'always good alike.' Bah! impossible! His wishes were, however, complied with, and plates most carefully selected sent on, some of which were rigorously tested and found faultless. The hour came, the group assembled, and the knight of the camera, with his assistant, was at his post. After the exuberance of spirits which is usually manifested on such occasions had somewhat subsided, that stereotyped photographic phrase, 'Now, steady if you please!' came forth as a signal; and then for a short space of time there was silence. To make assurance trebly sure three exposures were made; the group then dispersed, probably never again to reassemble; and the photographer, brim full of confidence, was soon closeted within the sanctum of his dark room. But, alas! 'How many a slipt 'twixt cup and lip.'

'How strangely this plate behaves,' he remarked to the assistant, as they both stood watching the development of plate No. 1; how slowly it comes up, and what a ghostly looking image. And certainly no amount of coaxing and dodging could make anything of it but a miserable failure. Plate No. 2 proved ditto; only, if anything, more so. The developer was now suspected, and a previously exposed plate was placed under its influence, which, however, developed splendidly, so *that* was not the cause of failure. There was still another plate left, and on that all hope now centred; and as 'hope deferred maketh the heart sick,' it was resolved, after a short consultation, to bring the uncertain to a certainty. And now the plate is in the dish, the developer flows over it. What anxiety, what suspense! Each second seems an hour. Ah! here it comes, bright and clear. What! good heavens! only part of the plate good; the rest poor, thin, and foggy, and, like the others, a hopeless failure. Now let us draw the veil of secresy around that dark room for a *few* minutes, whilst the plates, as well as he who prepared them, receive—well, no, not exactly benedictions. Poor plate makers! What an amount of responsibility each one of them carries on his shoulders; and yet how constantly they are tripping; it is really astonishing they are ever out of the law courts. I wonder if they are ever made the scapegoats for the sins of others. Let us see. The plate

maker now under consideration, himself an experienced photographer, was requested to come at once, naturally expecting to receive the warm commendations of his patron. Not so, however; it was that the vials of wrath and indignation might be poured out upon him as the reward of his bungling. He was shown the results his vile plates had just produced, and was almost dumbfounded. Recovering himself, he asked a number of questions of the assistant, in order to elucidate the cause of failure. Ultimately he left the house a sadder yet not a wiser man. He retired to his couch early that night, not to sleep, but to have a good think, as was his wont, over difficulties which his connexion with dry plates brought him too often. There he lay, cogitating hour after hour upon the events of the previous day, until he had almost brought himself to the conclusion that the plates were the real delinquents, and began mentally to discuss the question of compensation, when a thought suddenly struck him which brought instant relief. During the cross-examination of the assistant the latter stated that the governor exposed the plates himself, but the lens cap having been accidentally left behind he had made use of his own hand with which to cover the lens whilst the shutters were drawn; sufficient time was thus given to cause a thin film of condensation to form upon the lens, which of course prevented the image being properly projected upon the plate, and thus causing the disastrous failure. For once, at least, the plates scored a victory, and came out of the court of inquiry without a stain upon their character.

ON THE QUESTION OF MOUNTS.

By Valentine Blanchard.

The important question raised the other day in the law courts on the subject of mounts suggests a few remarks which may not possibly be out of place in these pages.

At the outset, it is only fair to assume that the manufacturer of the *mounts*, which produced such disastrous results on the photographs placed on them, fully believed they were quite suitable for the purpose; but this does not make the matter any better for the unfortunate photographer, and no small money compensation can make up for the serious damage done to his business.

Some little time ago an eminent photographer sent me some chocolate mounts supplied to him by a large stationary firm, and requested me to mount some photographs on them, and also on some other mounts of a different colour. The photographs were mounted with starch, and the weather being cold they were some time in drying. To my amazement the pictures on the chocolate mounts went spotty before they were dry, irregular patches of fading showing all over them, but the photographs mounted on the other tint exhibited no change. When I reported the result, it exactly corresponded with that of my friend. In this case, however, the photographer had used very few of the doubtful cards, and he had been most fortunate in discovering the mischief in time.

Some years ago, a very eminent English card maker sent me some cards to test which had been returned from a photographer in the Colonies as useless. Out of the three different qualities sent to me I had

to decide which was the most suitable for photographic purposes. The cards were white, and No. 1 seemed Bristol board of the finest quality, and No. 2 was an extremely good board, but No. 3 was much coarser and not so good in colour---not so pure a white in fact. On applying the nitrate of silver test, No. 1 showed a yellow stain almost at once, and No. 2 was also stained, but No. 3 stood the test. When I made my report the head of the firm expressed his amazement, and said, 'No. 1 is the very finest board that can be manufactured, but No. 3 we quite looked upon as too common for photographic purposes.' The No. 1 sample so praised by the firm, but which had not stood the test, was from the batch of returned cards.

It has been a matter of surprise to me that photographers have been so reckless lately in the mounts they have employed, particularly in what are known as surface mounts, for the pigment used is almost always largely composed of a mineral substance, and therefore only too likely to bring about most undesirable reactions on the silver image of the photograph.

As a matter of taste also, the use of these dark pigment cards—be they olive, chocolate, or black—for vignettes, has always appeared most objectionable, for it at once destroys all harmony in the finished work.

It is to be hoped that some good will come to photographers generally out of the trial, though none, alas! can come to those immediately concerned; and if it should act as a warning to photographers not to be so hazardous in their experiments, the principal actors in the drama will have suffered for the common good of the photographic community.

CHEMICAL CHANGES.

By C. H. Bothamley, F.I.C., F.C.S.

In the first half of this century most chemists considered that a chemical change had been completely investigated when they had determined the relative proportions in which the substances reacted, and the nature and relative proportions of the products. All such changes were put down to the operation of a special form of attraction between different kinds of matter, and this was termed 'chemical affinity.' Attention was concentrated upon the most valuable or most abundant product, and everything else was almost, if not quite, neglected.

To-day, however, it is quite different. We have learnt that although chemical attraction between different kinds of atoms is the primary cause of chemical changes, the nature of these changes, the extent to which they take place, indeed, whether they will or will not take place at all, is determined by the conditions under which the substances are brought into contact. Temperature, pressure, and the proportions in which the substances are mixed, all exert an important influence, and later experiments have shown that hitherto unsuspected causes may be of the greatest importance. It is well known that a mixture of carbon monoxide and oxygen will, under ordinary circumstances, explode violently when brought in contact with a light, but it has been found that if both gases are perfectly dry the mixture cannot be exploded in this way. Ordinary phosphorus is generally regarded as a highly combustible substance, the combustion being due to the energy with which it combines with oxygen, but if the oxygen and the phosphorus are quite free from

any trace of moisture, they may be heated together to a high temperature without combination taking place. The same is true of charcoal, and it would seem that in all these cases combination is dependent upon the presence of a very minute quantity of moisture.

At one time chemists constructed so-called 'Tables of Affinities,' in which the elements were arranged in an order which was supposed to indicate their relative chemical energies, so that, for example, a given element would displace from compounds any other element which came after it in the list. Wider experience has shown that such tables are utterly fallacious. If we have a mixture of potassium iodide, potassium bromide, and potassium chloride, and we gradually add to this some silver nitrate, silver iodide is first precipitated. When the potassium iodide has been decomposed, silver bromide begins to be precipitated, but it is not until the potassium bromide is decomposed that silver chloride is formed. If from these experiments we arrange the three elements according to their apparent attraction for silver, the order will be—iodine, bromine, chlorine. But if now we take some silver iodide and treat it with the element bromine, all the iodine is expelled and silver bromide is formed; and if we then take this silver bromide and treat it with chlorine, all the bromine is turned out and silver chloride is formed. From this second set of experiments the order would be—chlorine, bromine, iodine: *just the reverse of the first.* The fact is, that so-called relative affinities are determined not only by the nature of the elements, but by the conditions, and by the nature of the products formed simultaneously with the principal product.

It would be easy to multiply instances of this character. The great lesson which they teach is, that chemical changes which seem to be simple are in reality very complicated phenomena, and that the complete investigation of any given chemical change involves a consideration of many seemingly minute and unimportant points, both chemical and physical. Now many of the reactions which play an essential part in photographic processes are not only complicated because of the number of substances concerned and the number of the products, but are materially affected and even quite altered in character by the presence of very minute quantities of certain substances. It is evident that the solution of many of the yet unsolved problems in photography will involve minute and laborious experiments, and will call for the exercise of thorough chemical and physical knowledge. All mere speculation is of little value, and all experiments made in an unscientific manner without regard to the numerous sources of experimental errors serve only to produce confusion and throw a mist of contradictions around the problems to be solved, instead of the flood of light which is essential to their solution.

ON EXACTITUDE.

By John Nesbit.

In the course of experience in the practice of photography, one meets with certain difficulties, some of which are unavoidable, and others the result of pure carelessness, and a want of precision in the manufacture of the materials supplied to us by dealers. Whatever is undertaken to serve

me for a particular purpose, I have found that it is really easier to do the thing accurately than to commit some of the errors I have found in the work of men whose special business it is to send out what they profess to supply us with. Let me instance some of the troubles arising from the terms—'good' or 'near enough.' It is the custom for makers of dark slides to allow one-sixteenth of an inch of play on the top and side of the frame; to this I have no objection, as it admits any roughness caused by the breaking off when cutting up the glass. There is also about one-eighth of an inch of rebate on which the plate is to rest. Now, when we find that a second allowance of one-sixteenth is in the same way mostly found removed from the plate, there is a probabiltty of the latter falling partly through the aperture; in fact, this has occurred on some occasions to the great damage of the shutter and other consequences. There can be no excuse for such a vexatious incident, as there exists every opportunity for exact measurement. Especially is this important in the case of such a size as the popular lantern plate. I do not think there should be even a fractional allowance on a three and a quarter inch square glass, or in the carrier or slide. The annoyances ensuing from the edges not being true are purely preventable. A cutting board with slips at right angles, and supports for the rule at the various distances, once properly set, always turns off an equal shape with the same cutter, and yet it is a very general occurrence to find enough inaccuracy to cause great inconvenience to an exhibitor, who in his turn, knowing these wretched contingencies, provides a carrier suited to the largest and thickest of slides. One trouble follows on another with fatal effects upon the harmony and smoothness of the show, for often there is no time previously to examine miscellaneous contributions.

I have never been quite able to discover the correct proportions of a *carte* or cabinet card from either the actual examples sent out from the studio or by consulting illustrated catalogues. They differ to such an extent, both in thickness and size, that I would suggest that a pile of about twenty-five or so, from different sources, should be placed together and an average taken so as to form a definite and invariable guide to the makers of albums, who must have been perplexed by these changes to find precisely the amount of internal aperture required for their reception. What is the consequence? The family or fancy collection is disfigured by the pictures slipping about in the recess left beneath the openings, or else the lower part is seen protruding through the base, and the whole book rendered unsightly by the inability to close it up flat. I am not describing the cheap and nasty, but books sent out by some of our best manufacturers. I have dealt with only these—what I would like to call standard forms—leaving out those newer variations of greater dimensions which have been adopted, as in many cases these do not find any abiding place, except temporarily about the room, until they become abraded and soiled; or if they be honoured with a show case, they are seldom really suitable. All this arises from the want of exactness in cutting, and how easily remedied by a combination of those concerned, and thus allowing the public to enjoy their many beautiful productions.

Although it scarcely comes within the scope of my heading, I should like to make some reference to the formulæ attached to our supplies of plates. There is much and needless bewilderment in the statements of the component ingredients. The photographer reads over a new list of

instructions, but it is put in such a form that it looks quite different to anything he has seen before, when in reality it is just about the same as he last used; this is discovered after some nice little sums have been worked out. So many ounces of water, one ounce of this (how many grains?), to which add a few drops of a one per cent. solution of that, in which must be mixed so much of a 43·68-grain solution of something else; one and three-quarter ounces of the whole are then added to fifteen ounces more water, and so on. Why not avoid this pedantic striving after originality, by simply giving us the particulars in plain language, so that we may at once know how much of each chemical there is to be in an ounce of developer, and then it can be made up exactly from ten per cent. solutions.

There are many other points with regard to mounting, diaphragms, screws, &c., but as I have already done a long growl, you will think it time I should get into a better humour for reading your forthcoming welcome ANNUAL.

TO FREE SILVER PRINTS FROM HYPO AND TO DRY THEM.

By H. FARNALL.

AFTER a series of experiments with a very delicate test, which showed trace of hypo in most bought prints, I found that squeezing them between boards as hard as possible in a copying press four times left hardly a trace of hypo. The prints will come out of the press dry and like a mass of *papier maché*, but will separate in water. Between each squeezing they should be separated and allowed to take up as much water as they will. The whole operation is done in an hour. The greater the number of prints squeezed at once the better.

Have holes a little smaller than a half-crown punched by a card seller in cardboard discs, leaving a rim about three-quarters of an inch wide. After washing spread out the prints on a table. When they *begin* to curl roll them up, image *outwards*, and put three of the card rings on each; they may be heaped up to dry, or put in a basket before the fire. They will have a beautiful and natural surface, and be dry in two hours in a warm room. The above size of hole is for a $7\frac{1}{2} \times 5$ inch print rolled about its shorter side; a larger print would require a larger hole, or it would stick and dry very slowly.

STRIPPING FILMS.

By W. H. DICKSON (Dunedin, New Zealand).

THE many advantages accruing from the substitution of a paper for a glass support to the sensitive film, especially in outdoor photography in a mountainous country like New Zealand, have induced me during the last twelve months to experiment with the products of the various makers, and as my experience—although I can say little that is new on the subject—may be of some assistance to others, I am led to give it.

I have tried, I may say, the films of almost all the makers; and though, with one exception, I have found them satisfactory in working and capable of giving good negatives, yet none of them seem to possess so many

advantages as the Eastman stripping films, nor to yield, so far as I am able to judge, such a uniform result, when I state that with these films I am able to get ninety-five per cent. of printable negatives, and that not two per cent. of the failures are due to faults in the films themselves, I give the highest possible testimony to the excellence of the product and to the care which must be exercised in its preparation.

The sizes I work are $\frac{1}{1}$ and 10×8. Formerly, with glass plates, I found a half-plate camera and three double backs, being six exposures, nearly enough in rough, hilly country, but on account of the portable character of the roller slide and the lightness of the films, I am now able to substitute for the above forty-eight exposures 10×8—a very material difference.

In working the films, after the first trial I have experienced fewer difficulties than with glass plates. The development is exactly the same as with glass plates, the only requisite, which is really a requisite *sine quâ non* in all photographic operations, being absolute cleanliness. After soaking the film in clean water for about thirty seconds I pour off the water and pass a camel's-hair brush two or three times gently over the coated side, which at one and the same time prevents air bubbles and causes adhesion to the bottom of the dish. Only about half the quantity of solution used for a plate is required if this plan is adopted. I have tried many developers with the films and have obtained good results; but those work best in which carbonate of soda forms the alkali, the negatives being bright and peachy, with plenty of contrast and full of detail. Development proceeds rather more quickly than with glass negatives, and the quicker the development, so long as it is under control, the better the picture, and the more easy of accomplishment is the after process of removing the paper support. Greater *apparent* density is needed than with a glass support on account of the more opaque character of the paper, but density must not be carried too far. When sufficiently dense, I wash for ten minutes, then immerse for two minutes in water containing ten to fifteen drops of hydrochloric acid to the pint, so as to thoroughly clear from any pyro stain. Alum must on no account be used if it is afterwards intended to strip. Thorough washing is needed after this acid treatment. I then fix and wash for about ten minutes. In stripping, I proceed according to the Company's printed instructions up to the point of placing the film mounted on its temporary glass support in the warm water, when if, after the lapse of two minutes, the paper shows unwillingness to separate at the edges or corners from the film, as it sometimes does when development has been prolonged, I gently press the paper forward at the centre, so as to cause a tear or break in it, and I find it is afterwards an easy matter to remove the whole of the remainder of the paper support. The tear or break in the paper is an easy matter with a very little care, and I have never damaged a negative in making such a break. With a negative which has occupied only a normal time in development, the paper support comes easily away in one minute's soaking in water as low as 80° Fahr., whilst I have used water as hot as 200° Fahr. without injury to the negative. In prolonged development the pyro seems to set up a hardening action upon the soluble gelatine which holds the film to the paper, which action is greatest at the edges and corners and least in the centre. The long development also leads to the softening of the paper support and facilitates the break I have

referred to. The stripping operation sounds formidable when described, and seems to be regarded as the *bête noir* of film photography; but it is simple enough in practice, as evidenced from the fact that during the last three months I have not lost a film in stripping. If it is not convenient to strip at the time of developing, I put the negatives, after drying, in a book and strip when convenient, even if a month afterwards; the only additional trouble being to soak for a few minutes in water containing ten to fifteen drops of hydrochloric acid per pint before squeegeeing on to the temporary glass support.

The special advantage I find in the use of the films, in addition to their portability are—(1), Freedom from breakage and consequent loss of valuable and often irreplaceable negatives; (2), Facility of storage and small space occupied by the negatives being less than one-fiftieth of that needed for glass negatives—a most important consideration; (3), Facility for transmission by post, or otherwise; (4), Negatives may be printed from either side. It is claimed also for these films that they are free from the annoying defect of halation. I regret to say they are not absolutely so in my experience, but I think they are more so than most makes of glass plates.

A word as to the Eastman roll holder. This is a very convenient piece of apparatus, especially where a large number of exposures have to be made and whole spools can be used up straight away. For the user of only one or two exposures at a time, however, it is by no means so well adapted, as the waste at each cutting off is too great. This should be easily remedied by a little ingenuity. The arrangement, too, for marking off the exposures is not so good as it might be. The attention of the Company has no doubt been drawn to these points, and it is only to be expected from their well-known enterprise that a perfect roll holder will soon be at the disposal of the public.

'DETECTIVE' CAMERAS.

By T. C. Hepworth.

In response to our worthy editor's flattering request that I should write something for his annual budget, I dot down a few notes which I have gathered during the past season while at work with two or three different forms of 'detective' cameras. The word 'detective' is a misnomer, for as far as I can learn the instrument has never yet been used for detective purposes. I once paid a visit to Trafalgar Square when a forbidden meeting of Sir Charles Warren's lambs was expected, and I took a detective camera with me. The only result I obtained was the figure of a very small boy sitting on one of the fountain parapets, with two stalwart policemen apparently keeping guard over the terrible young Socialist, so that in the sense that I secured a couple of detectives on this occasion my camera is truly detective. One picture, however, I have in my possession which can truly be described by the new adjective. It represents a man in the act of pouring water into a milk can, and as the picture will probably be published as soon as these words appear in print, I need say no more about it save that it is a perfectly genuine thing; that is to say, there was no pre-arrangement or posing, nor did any one but myself know that a camera had been used.

From what I have said it may, perhaps, be assumed that I have no

great faith in cameras of the detective genus. As detectives I have not, but as a convenient method of taking small photographs I have the highest possible opinion of them. Indeed, I believe that they will almost entirely supplant the old pattern quarter-plate camera. The latter must still be used for dull days, and for dark subjects, together with its inevitable tripod, its focussing cloth, and its box of plates; but for bright weather its handy little rival is bound to supersede it.

I have, I think, seen and handled nearly every detective camera now in the market, and after due consideration I hold the opinion that something better can be produced and will be produced before long. The Kodak is a little marvel of constructive skill, and it is a pity that it is not a trifle larger. Its makers would do well to introduce something on the same lines with a lens of longer focus, and which affords a picture at least as big as a quarter-plate. Messrs. Marion's parcel camera is also a good thing, but it wants a few little alterations to make it more perfect. I mention these two types of cameras because they both show originality of construction, and will do good work. By far the greater number of the so-called 'detective' arrangements consist of ordinary cameras placed in leather-covered boxes, and are singularly wanting in originality. Moreover, they are so much alike, and are becoming so familiar, that people know them for what they are, and concealment is at an end.

Detective cameras are, as a rule, too elaborate. As a result of plenty of experience with them during the past season, I have come to certain definite conclusions respecting them. To begin with, a focussing glass of any kind is a useless superfluity. The operator may possibly feel the want of his customary ground-glass screen, and perhaps his first two or three pictures may be anything but perpendicular; but he will soon get over that difficulty. Next, a finder is quite unnecessary. A novice may possibly find it useful, just as a man who handles a sporting gun for the first time will find the 'sight' of value, but after a little practice both photographer and sportsman are able to secure their game without any such help. Thirdly, focussing screws, levers, or other focussing adjuncts, can be quite disregarded. The focus should be a fixed one, and there is no kind of difficulty here if a suitable short-focus lens be employed. The only disadvantage, perhaps, is the inability to secure sharp images of objects which happen to be very near to the camera, so that an instrument that needs neither focussing screw, screen, or cloth, and which is independent of a finder, need not really be of very elaborate construction. I need say nothing about the best type of shutter, for there are plenty of good ones which can be applied to the purpose in hand. It should be capable of variation from 'very quick' for sea views, to half that speed for street views and ordinary work.

I notice that several of these hand cameras employ metal sheaths for the plates. This, I think, is a slightly better arrangement than the ordinary double back, but I do not think that the method will live. What I mean is, that in the perfect hand camera of the future—which is doubtless in embryo in somebody's brain, certainly not in mine—the plates will be used just as they come from the makers. The sheath system might remain if glass plates were of one uniform thickness, but as they are not, it represents a weak spot which needs attention. All who have struggled with extra thick plates, and sheaths too small for them, under the dim light of the red lamp, will know what I mean.

I have taken a large number of quarter-plate negatives with a hand camera, but I hardly appreciated the future before this type of instrument until I saw them enlarged to 18 × 14. The pictures are very little inferior to those taken direct with a camera of the latter size. One more word, I find that some of the plates in the market are immeasurably superior for this class of work to others. Quickness is not the one thing needful, the plate employed must give good quality as well, or the negatives obtained are not worth the trouble of taking.

MENDING A PORCELAIN TRAY.

By John Birtles.

On one occasion I had a large and valuable porcelain dish broken by its falling from the hands of a young man who was engaged in cleaning it. This was a serious loss, for at the locality where I then was nothing of nearly similar dimensions could be obtained, and several days would elapse before one could be procured. I thought over all the cements that were likely to serve the purpose of joining the pieces together, but none of them seemed as if they would answer.

A friend to whom I mentioned my mishap told me of a cement of which I had not previously heard, but which he assured me would effect a union so secure, that if adopted, and the dish was again to fall, it would break anywhere else than at these junctions.

Acting under his directions, I rubbed together Price's glycerine and common litharge, mixing them very intimately to the consistence of dough, and first moistening the broken edges with glycerine, I applied the cement and firmly bound all together. I allowed it to remain undisturbed for about a day, when I found my tray well joined together and ready for use.

LAMENTATION AND CONSOLATION.

By J. Hubert.

O tempora! O mores! What has become of professional photography? Is life as a disciple of the black art still worth living? Behold the army of the invader mercilessly pouring forth, carrying on organized warfare against our imperfectly armed professional ranks! What is their intention? They run, they swarm, and still they come.

Here is a gigantic camera, overshadowing my humble 10 × 8, as I want to take the rectory and church—a 2*l.* order. But what is the meaning of these waggons, tools, the battering-ram, and those men in their Sunday best, carrying Prayer-books? The scales are falling from my eyes; it is an amateur artist. I define his intention; he wants all these things to support his composition. The battering-ram will evidently be used for levelling that objectionable house, that load of tombstones is indispensable for the perfection of the bare churchyard, and the black-cloth men will undoubtedly be placed into a suitable position, shaking hands, to represent the black sheep in the congrega—— I mean the black spot to contrast and balance. But who is it in yonder carriage?

Why, I declare, Mr. H. P. Robinson himself, specially engaged to superintend the whole, I suppose.

Awestruck I run away. In my hasty retreat I stumble over no less than three tripods, and before I have time to recover, one of the fair sex unfolds her shawl, beneath which, partly concealed amongst flowers, I instantly recognise a detective camera. Scarcely able to ejaculate the name of the great photographer who was near (Jack Robinson), the trigger moved; her prey was secured. What a figure I shall cut! I implore the heartless one to demolish my counterfeit; she will not consent to smash me up. I declare I will bring an action; but oh! the law! Firing the shot with her own hands has secured her the copyright as well. Nobody being near, I could very well have overturned a man's machine, but I am too chivalrous to do that to a lady's.

Wondering what eventually will become of me when I leave the lady's bosom for further development, I arrive home at last in a frantic state; but no solace even there. An order for a group countermanded. An amateur had kindly offered to photograph it at cost price, the only extra charge being his expenses for the day, including a champagne supper. Now, dear colleague, is not that enough to turn a photographer's brain? Well no, you may scarcely credit it, but the measure was not full yet. Only one week more to the grand bazaar, which hitherto proved an annual income to me, and no order yet. Anxious to know the reason, I see the Secretary. 'What can the matter be?' 'My dear friend, nothing at all.' 'Dissatisfied?' 'Certainly not; but you see you could not expect us to be so foolish as to pay for what we can get for nothing. There, that group of three donkeys, entitled, *Are we not four Beautiful Objects?* sells at 1*s*., and you *charged* us 1*s*. 6*d*.!' Just then a stall-keeper actually came up to me smilingly, 'Buy a photograph of the rector's poodle, sir?' followed by a lovely girl, '*Photograph of the rector in the act of offering up prayers to improve bad trade, in season now.* Buy, buy, *buy!*' Secretary whispering to them to change the subject, and wishing me good-bye, incidentally reminds me of the photographer who has just committed suicide, which terrible news is not at all calculated to improve my condition. In fact it overpowers me. Am ordered to the seaside. Wonder how the itinerant on the beach is getting on. I addressed the only one I could see, whereupon he pointed out to me two young students with cameras photographing loving couples. 'Why, them scamps collar'd my best trade,' he said. 'They made a bet who could take the most money. After paying their expenses, the surplis is going to Lord Grosvenor's charitable amateur photograph club. But that's not all; they be a-talkin' of foundering clubs all over Brit'in, each to build travelling studios, which are intentioned to be wheeled from house to house, a-taking all inmates, receiving no cash 'cept voluntary conterbutions, which are to be given to the hospitals.' As the poor itinerant fancied I was some guardian, he asked me whether I could not use my influence to procure him admission to the union.

Pondering, I went to my hotel, where I found a telegram from my wife: 'Amateur wants to borrow negative of friend for enlarging; offers five shillings; what answer?' Wire back: 'Thanks for generosity' (Five words more. What else shall I say? Upon my word, this is my first temptation of using an oath. However, I do not yield, and write instead, with ferocious intentions), 'wait till see gent myself.' There,

that surpasses all. Have serious thoughts of leaving the profession and entering the Salvation Army. Nay, that's cowardly. I better leave off lamenting, and see whether I cannot find something to console myself with. Happy thought! Have circulars printed: Lessons given in photography; amateurs' negatives exposed by electricity, developed, retouched, printed, and finished; special dark room to practice in; new and second-hand apparatus and chemicals always in stock; non-oxidising one-solution developer; Hardwich's and Traill Taylor's *Photographic Chemistry*; Hubert's *Retouching made Easy*, Second Edition, &c. &c.

Yes, that will perhaps make up for the loss in the out-of-door trade—*one* consolation; but that is insufficient. Amateurs take portraits also, and pretty good ones occasionally; therefore the hope that they can do little harm in that branch is not to be relied upon. If the professional wants pecuniary consolation, he must find some remedy. Now let us see what is likely to be an efficient one. Exterminating the amateur is too radical a measure, I fear, and I don't think he can be persuaded to leave portrait photography exclusively to the professional, nor can we coerce the underpaid parson to pay for his bazaar portraits when he can get them gratis. It is a bad outlook truly, but I think another consolation still exists. It is true the knowledge of portrait taking may be rapidly acquired, and the artistically educated amateur will quickly learn to take an infinitely better land or seascape than the professional who is not so gifted; but, fortunately, it takes years of study to make a successful portrait photographer.

After all, then, there is no cause for the hardworking and energetic professional to be altogether discomfited. If he has artistic talents but lacks the study, let him banish pride and gather the necessary knowledge. If he is no book-keeper, and devoid of self-assurance, and single, let him marry a pretty post-office clerk; or if he is without commercial achievements, a butcher's, greengrocer's, or fishmonger's daughter. For the married man so situated there is little hope besides the Divorce Court or summary ejection. But I must not digress; the ALMANAC space is too precious for that. So to summarise, I may say that the art and science of photography is revolutionised, in fact elevated, towards the pinnacle of perfection, and the brethren of the craft who understand to rise with her will be sought after even more than formally, whilst the bungler alone sinks into oblivion. But what business had such an one to enter it? Photography used to be in many instances the refuge of the lazy and uneducated. The baser elements having been eliminated, it is now a calling that will cease to be despised, when the knowledge is spread that it requires culture and taste, education and talent, besides years of experience, to cater for a public which, by dint of its own progressive art-education, no longer accepts an inartistically posed, badly lighted, or hard photograph.

TO STRIP EASTMAN'S FILMS.

By H. FARNALL.

I HAVE found it next to impossible to strip Eastman's films after they have once dried, and have found that even if stripped immediately after fixing they always frill on intensification, especially when intensified locally with a paint brush. I therefore tried to get a better adhesion

between the film and the temporary glass support, and have found the following successful:—

Soak sixty grains of Nelson's No. 1 photographic gelatine in cold water, drain and add boiling water to make up two ounces. Make a cold saturated solution of chrome alum in water, then make with hot water a solution such that each drachm contains one minim of the saturated chrome alum. Mix the gelatine and the dilute chrome alum solutions in equal quantities. A few drops of carbolic acid will keep it good. This mixture will melt if the pot is stood in nearly boiling water for a quarter of an hour. Let it cool to about 80° Fahr., pour some on the indiarubber and collodion-covered glass plate, pour the excess back, put the soaked negative on the plate and squeegee down. Then dry either spontaneously or with gentle artificial heat. When quite dry soak for ten minutes in cold water, put in hot water, lift one corner with a pin or forceps, and pull off the paper. The soluble gelatine backing may be rubbed off with the finger, there is no fear of moving the image bearing film, even undilute hydrochloric acid will not frill it. If the gelatine mixture is used often a little water should be added each time to make up for evaporation, or it will cease to melt with heat. After stripping seven dozen without the least difficulty, I have come to some negatives the paper of which becomes almost waterproof after drying. By using three times the above amount of dilute chrome alum solution, and soaking longer, the paper may be *pushed* off with the finger. Perhaps glycerine in the last washing water would remedy the evil.

HYDROQUINONE AS A DEVELOPER FOR CHLORIDE PLATES.

By. Alexander Cowan.

Hydroquinone, as an agent for developing bromide plates, has, during the last two years, become so popular that a few notes of experiments made with it on chloride plates may, perhaps, be acceptable. Its action on chloride is much more energetic than on bromide plates, but if used without a restrainer on an unexposed plate it will generally fog entirely in thirty or forty seconds, but if to the same solution the smallest trace of bromide of ammonium or potassium be added, the plates will develop beautifully clear; but chloride of sodium, as generally used as a restrainer for chloride plates, does not act in the same manner.

One-tenth of a grain of bromide of ammonium has been found to be sufficient even if a large proportion of alkali is used. It should also be noticed that the time of development with a minimum of restraining bromide is very short, sometimes not more than thirty or forty seconds, and to gain the fullest density rarely more than two minutes is required. A great variety of colours may be obtained by using with it different alkalies or different proportions of the same alkali.

The following may be taken as a good formula to start with, to be modified according to requirements, viz., to each one ounce of developer—

Hydroquinone	2 grains.
Ammonium carbonate	10 ,,
Sodium sulphite	16 ,,
Ammonium bromide	$\frac{1}{10}$ grain.

This will be most conveniently made up where small quantities are

required from ten per cent. solutions, but where larger quantities are wanted it may be kept in two solutions, as follows:—

Hydroquinone	40	grains.
Sodium sulphite	320	,,
Bromide ammonium	2	,,

in water up to ten ounces.

And, in another solution, ammonium carbonate, 200 grains; water to make ten ounces. Equal proportions of each mixed together, according to size of plate to be developed at the time of using.

For the ammonium carbonate solution may be substituted potassium carbonate, sodium carbonate, or sodium silicate.

The different alkalies somewhat alter the colour of the image; perhaps, taken altogether, ammonium carbonate is to be preferred, as it gives a very rich, warm colour, which may be modified by after treatment. If a fully developed and slightly over-dense image (after fixing and washing) be placed for a short time in a bath of half an ounce of hydrochloric acid, and a quarter of an ounce of perchloride of iron to twenty ounces of water, the red colour will immediately change to a blue, which, after rinsing well and placing again in the hypo bath, will change to a very rich chocolate colour with a slight reduction of density, and if after washing again be not considered light enough, the process may be repeated till the required density is obtained. This will be found to be a more reliable method than aiming to get the right depth in developing.

It may be mentioned that of all the above alkalies, ammonium carbonate alone, although given a splendid colour by transmitted light, has a disagreeable greenish surface colour. This, however, is of no moment when the images are to be viewed as transparencies.

Smaller proportions of alkali may be used, and will give still warmer colours and much larger proportions; up to forty and sixty grains to the ounce have been used to advantage, adding slightly larger quantities of bromide if required. The same solution may be used for several plates in succession.

It will be noticed the ammonium carbonate developed images, although they may be of a deep red colour when fixed, will be of a more neutral tint when dry. The larger the proportion of alkali used will shorten the time of development and give colder tones.

Sodium and potassium carbonates give quite a different tone of colour to the ammonium carbonate, and may, by some, be preferred. There is also much room for experiment in fixing the exact proportions best to be used for different kinds of negatives, and also whether varying proportions of the different alkalies may not with advantage be mixed together.

THE ELECTRICAL SPARK FOR MICRO-PHOTOGRAPHY.

By William A. Brice (49 Mura S. Chiara, Genova, Italy.)

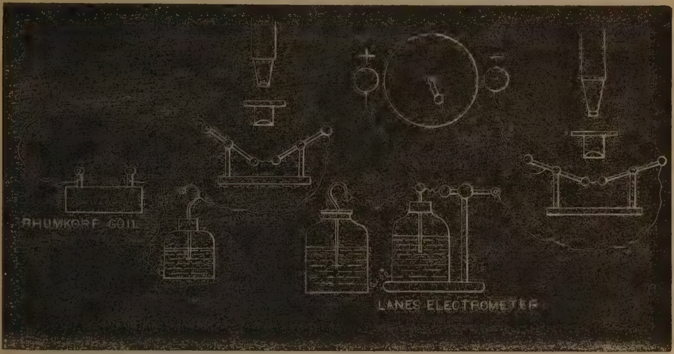
Judging from the innumerable offers for sale of electrical machines, of every description, constantly appearing in the columns of the *Exchange and Mart*, two facts may be inferred, both indirectly interesting to photographers (amateurs especially) and microscopic photographers particularly, if they will read what I shall now endeavour to explain. The first

deduction is that these machines, generally, are rather widespread and numerous; the second is that, after all his acquaintances have been duly shocked, and a limited number of thunder-house, pith balls, bells, &c., experiments duly performed before a select and admiring audience, which daily becomes more select till it dwindles down to zero, watching sparks, however bright, not being eternally recreative, the happy possessor of the said machine becomes thoroughly disgusted and *sells*.

He need not do so, however, in future if he will only add photography to the list of his already numerous acquirements, together with the simplest of microscopes, for his sparks, which are so loud as to be the nuisance and torment of all auditors, can now become a source of equal pleasure, even to those who little sympathised with the eternal crackling. Let him take his most powerful Leyden jar and charging it either with an electrical static induction machine, preferably of the Voss type, which seems almost absolutely independent of damp, giving good sparks even when it rains, or charging it by connexion with a moderately powerful Rhumkorf coil, these will furnish him, in connexion with photography and the microscope, an endless source of amusement and occupation for the long winter evenings, as, if he works intelligently, his labour will also ramify itself into exhibition of his micro-photographs by the optical lantern. Working with these means at his disposal, with a little practice, and, if possible, under more experienced guidance, he will possibly obtain results such as, I believe, have never been accomplished hitherto, so far as my knowledge goes, for by using a succession of brilliant sparks, to all intents and purposes a mere point, as the source of illuminating power in connexion with a bull's-eye condenser or other, at about four inches from the spark, we shall without the least tremor (the electrical apparatus being, of course, worked at another table, say, either by a rat or squirrel in a drum, or, if preferred, by hand), we shall, I contend, be able to subdivide our illumination *ad libitum*, the complete series of flashes or sparks, say fifty, which I have tried *with success*, giving us a sum total of correct, sufficient exposure; and this now opens another fact, never, I believe, mentioned before, namely, the possibility to obtain in the finished negative one harmonious whole of an object having any variety of thickness, spite of the optical difficulties involved in obtaining absolute sharpness of plans of various foci simultaneously, a thing, I believe, hitherto deemed impossible, at least in microscopic work. Let us examine the proceeding and we shall at once discover its feasability. Say fifty flashes are required for a full exposure; having, of course, got everything first into focus for the lowermost plane of our object, or uppermost, it matters not which, by means of a lamp and mirror, &c., now excluding all white light from the room, let us give, say, ten flashes or sparks to the lowermost plane at sharp focus; next, if our fine adjustment is worth anything, we can turn the screw (by a red-light lantern) an infinitesimal quantity up or down without producing any shifting of the image, at least it ought not to do so if properly made; turning fine adjustment to and fro might do so perhaps, but not if we turn steadily in one direction only. Now ten more flashes on this plane and again a slight infinitesimal turn, again ten flashes at this new plane of focus, and so on till the uppermost plane of our object is reached. Now it is obvious that each series of flashes or sparks must have impressed to perfection each successive plane *with the intermediate* planes besides. The sum total of the exposures has been sufficient, and

the result will be a harmonious blending of the different planes of focus, which though taken separately, now form one perfect whole, with everything apparently in correct focus, just as if we had had to deal with one plane only.

If used with Coil. If used with Plate Machine.



All that is, therefore, necessary is by whatever means most convenient, say by a Lane's electrometer, or spark-measuring Leyden bottle, to produce first a long and powerful spark between the electrical machine and the principal operating spark, and then between the balls of a Henly universal discharger, or any means most convenient; this latter spark, which is to be used in connexion with the bull's-eye or other condenser, say Abbe's, must be very short, say one-sixth of an inch, and as thick as obtainable. About three inches above this is the bull's-eye condenser, and the object to be photographed about half an inch above the condenser.

The microscope may be used either horizontal or upright, as described in my article in the ALMANAC for 1888, in which, let me mention, are two *errata* and an omission; this latter is the advice to try all heliochromic plates and experiments, *in connexion with the polariscope*, which is far easier and satisfactory to manage than the solar spectrum, as this necessitates very special apparatus. The *errata* is owing to a full stop misplaced, which makes it unintelligible, but should read thus:—'And place it in full sunshine. A quarter of an inch below your object more or less, by a ring of cork or other plan, fix the lower lens of any spare eyepiece, &c.'

This division of exposures, all tremor being eliminated, opens up another field of study, namely, distinction of rapidity between various photographic plates, developers, chemicals, &c., by means of comparative experiments, but, of course, the comparisons only hold good as tried by one given machine at one given time, as the vividness and actinism of each spark undoubtedly varies with the tension of the electricity and the difference of the surrounding atmospheric planes, two factors impossible to secure under identical conditions, otherwise the long-sought, much-desired 'standard of light for comparative experiments generally' would have been accessible to me.

SUBSTITUTE FOR FOCUSSING CLOTH.

By Wm. M. Taylor.

It may be interesting to some reader to know of a plan which I use on my camera, and which enables me to dispense with the black cloth, thereby avoiding inconvenience and trouble.

Attached to the focussing screen I have a wire frame, shaped like a square, tapering bellows, diminishing towards the end furthest from the camera. This is covered with black cloth, and has an elastic circular aperture at the end, which may be used with the naked eye or with the focussing glass.

The advantages of this are:—

1. The wire frame keeps it at its full distance from the screen, but accommodates itself to the correct focus by merely pressing the orbit, and thereby leaves both hands free, and allows free respiration in the open air.

2. It folds in with the camera without occupying any extra room.

SATURATED SOLUTIONS.

By W. M. Ayres.

Photographers sometimes complain of the slow solubility of crystals when placed in a vessel of water. Suppose that any such substance as hyposulphite of soda or sulphate of iron be introduced into a bottle and water poured upon, unless it be constantly shaken up it will be found that a saturated layer rests upon the undissolved crystals and prevents the rest of the water from being able to act upon them.

Solutions ought to take place from the upper stratum of the water, for in proportion as this gets saturated so does this saturated solution fall to the lower part of the vessel and make way for the plain water, which will take its place, and in turn will exercise its solvent power. It is known to many readers that several years ago I devised and had made some vessels which most perfectly fulfilled the required conditions. Some idea of their construction may be obtained from the following:—

Into the wide mouth of a jar, which for convenience ought to have a spout like a teapot and also a handle (indeed a large porcelain teapot will answer very well), have fitted a second vessel which sits nicely into it without dropping through, a ledge or turned-over rim preventing this, and have it perforated with holes to permit of the water having free access to its interior. If now the crystals to be dissolved be placed in this receptacle, and it is then lowered into the water, solution immediately begins and the saturated water sinks downwards. Any open fabric will serve a like purpose when formed into a bag and retained near the top of the water.

IMPROVED LENS MOUNTS WANTED.

By W. H. Harrison.

Of late years a slow but effective course of improvement has been visible in the construction of tourists' cameras, but little has been done in the way of meeting palpable public requirements in the perfecting of lens

mounts for outdoor work. When one lens has to be changed for another after the camera is erected, the unscrewing and screwing lenses into the camera front not alone always involves irritating waste of time, but sometimes prevents the operator from photographing effects which he desired to obtain but which passed away meanwhile; such cases must have occurred to every one with large practical experience in landscape work. If the lenses to be changed happen to be of the Steinheil class, and to have been brought from a cold place into a warm atmosphere, so as to be covered with dew, the amount of screwing and unscrewing necessary to remove each element from its mount to submit it to 'wash-leathering,' and then to replace everything ready for work, are operations too painful for contemplation. Some landscape men I know apply the words 'abominable nuisance' to these manipulations, and Mr. G. L. Addenbrooke, who possesses rationally mounted lenses for outdoor work, says that he never knew what real comfort in tourist photography was until he had a proper universal mount made; his lenses are whipped into their mount, and the mount into the camera front in the twinkling of an eye, by means of bayonet joints, and he says that there is no truth at all in the popular rumour that lenses so mounted are liable to drop out of their proper places or to fall from the camera. His paper on the subject, read before the Photographic Society during the 1887-88 session, deserves study.

If some independent scientific organization would devise a proper mount and its measurements, and all opticians would adopt it, it would be a boon to photographers, and probably increase the sale of lenses, because at present the more lenses a man buys the greater is the increase of the troubles hereinbefore indicated, and the more adapters or extra camera fronts must he carry. No lens mount should ever be sent out without a spare empty cell at the back, which can be simply pushed on or pulled off the lens tube; in this cell flat pieces of coloured glass can be inserted for orthochromatic purposes at the will of the tourist. In time lens mounts of the present type will become as extinct as the dodo. Cannot they be made of some lighter metal, and of a material which will not rust? Would aluminium bronze not be better than brass? It does not rust, and is tougher than gun metal. Mr. A. Haddon reduced the weight of a lens to a considerable extent by making a small portion of the mount of brass and the rest of a tough sample of ebonite; the whole had an elegant appearance.

HOW TO WASH PRINTS WITH LITTLE WATER.

By Professor Coleman Sellers, E.D.

Trim the prints before toning. Use the same toning bath day after day, adding fresh gold each time it is used. Fix in fresh hypo. Two dozen whole-size prints can be well washed with one pail of water by using two dishes 8 × 10 size. Fill one half full of water and transfer the prints to this from the toning bath one at a time, washing each print through the water in another dish to take off the greater part of the hypo. When all are in prepare a second dish of water and transfer the prints one at a time to it, continuing this process until the water in the pail or bucket has been used up. It takes half an hour to do this, and the prints then placed between blotting pads are ready to mount at once before drying.

In our bright light I have many times printed with three frames two dozen prints, toned, fixed, and mounted them in three hours. I have prints washed in this manner, now twenty-five years old, quite bright and showing no sign of fading.

THE NEW RECRUITS.

By Rev. B. Holland.

In these days when societies flourish and clubs abound, and, above all, when the Almanac is published with unfailing regularity, it cannot be impossible for the most inexperienced or isolated photographer to secure advice and help which will steer him clear of a certain amount of difficulty. Amateurs who have plodded through the first troubles and reached success are willing to direct the less expert brother in his early struggles, and many of the published articles contain just the information he requires. But for all this I can conceive of cases where the novice is yet floundering in the regions of fog, and mist, and blackness. Where this happens disappointment will necessarily result, and it is to guard the beginner against disappointment these words are penned.

Plate making is sometimes disappointing. You do not always get what you aim at, although if your aim be modest, it may generally be safely reached. Dabbling in numerous formulæ is a mistake; very little is to be gained by it, unless out of pure love for experiment and chemical study you do not mind spending both time and money to gratify such a taste. A simple emulsion made in the simplest way should answer all ends. Opportunities for instantaneous shots are not so numerous as those presented for securing attractive pictures, less pretentious perhaps, but quite as beautiful as many taken with a rapid shutter. Make, then, a good all-round plate if you make at all, and hold in reserve just a few of the most sensitive for emergencies.

Developers are sometimes disappointing. For the sake of trial and comparison I have used pretty well all known concoctions, and to those who are tempted to do the same in the hope of improving their negatives I would say 'Don't!' A plain solution of either ammonia or soda with a restraining bromide and dry pyro will yield the best printing negatives any one can make. Many plates will work beautifully with the first-named alkali; but sometimes, if development is prolonged, green fog will appear. Soda rightly used will suit any plate, and the resultant prints should be all that can be desired. There has been much said about the ugly colour soda imparts to the film, but as a negative is only a means to an end, whatever makes it the *best* means will be adopted by the wise.

An unsuspected cause of failure perhaps, in some cases, is impure water. Chemicals have been condemned when the water used for mixing them was solely at fault. I speak from experience. Hard pump water is frequently recommended for making up the developer, but in my district the pumps are all useless for the purpose. Pure rain water has to be substituted for spring, and then all works well. No negative developed with the hard water to be obtained here is perfect, and possibly the same difficulty may be traced in other places.

Unless you desire to court failure do not expose plates in a bad or improper light. Do not, when you have given about the right exposure,

spoil the effect by hasty development. Take 'slow and sure' for a motto in the dark room, for it is better to obtain one good negative in half an hour than to ruin six in fifteen minutes. Do not use a landscape plate for taking a portrait, and if ever a negative has to be intensified use caution and care. I presume, of course, that the amateur is addicted to landscape work chiefly, and uses plates specially suitable for it. As is well known, for landscape pure and simple the most rapid plates are not the best, and for this reason the landscapist is more likely to be suited if he makes his own. He can make a *slow* plate, and using it on the lines indicated above will no doubt discover an improvement both in negatives and prints.

VIGNETTING.

By E. C. Middleton.

The writer has found the following the most simple and reliable method of producing uniform vignettes:—Upon a white card, *a* (see sketch), should be mounted a piece of paper, say light blue, marked *b*; upon this again a darker colour, *c*; and lastly a black piece marked *d*, of such a shape as is consistent with the vignetting mask required. The size of the copy is immaterial.

A negative is then taken of it, a small stop being inserted to prolong the exposure, and during the whole of the time the camera should be racked in and out an inch or two, so producing a negative not sharp, but in which the edges of the various papers are beautifully vignetted into each other.

By placing the negative so produced in proper position in the printing frame during the operation of printing, vignettes of the softest and most uniform character will be produced, even if printed in the sun. Two or three sizes may be made from each copy, and a set of, say, twelve will answer almost any requirement and last for years.

DISCOLOURATION OF PAPER.

By Ellerslie Wallace (Philadelphia).

A great deal has been written about the fading of silver prints on albumenised paper, but I should like to call attention to the possibility of discolouration of the paper itself from age being mistaken for fading of the silver compound. Different papers are differently made and finished by different manufacturers, and I am quite certain of having seen samples that would turn to quite a deep caramel or buff hue when simply hung up on the wall of my study for a comparatively short time. I have also seen pieces of certain kinds of paper that I had used as book-markers show decided darkening of the exposed portion in a few weeks or months. Other kinds, again, remain absolutely white for a very long time, even when dust and smoke settle upon them, merely blowing off with the breath or tapping with the finger being all that is

necessary to restore the paper to its pristine whiteness. As no practical photographer can control the manufacture of the paper on which he makes his prints, it may be well for him to remember that there is a possibility of the paper itself being in fault, and that he need not be hasty in condemning anything in his routine of printing manipulations, if he has reason to believe that everything is right in that direction. Let him rather take a piece of the paper he is using and, after dating it, pin it up on the wall of the workroom. Then, after leaving it there for some weeks or months, let him carefully take it down, blow the dust off, and compare the colour of the front, or exposed, with that of the reverse, or protected side. An experiment of this kind that I have just made within six months past, gave the exposed side deeper in tint than the paper binding of THE BRITISH JOURNAL PHOTOGRAPHIC ALMANAC, which I have had the pleasure of reading now for so long a time, that I am quite sure no paper whatever would have stood the test.

QUICK *VERSUS* SLOW PLATES.

By W. J. STILLMAN (Rome).

THERE seems to be an insanity afloat in the photographic community, a mania for quick plates, a mental malady which, like whooping cough, is more prevalent in the younger part of the community than in the elder, and the severity of which decreases with age and experience.

The absurdity of this mania would be apparent to everybody who thinks, if they would but consider that the tendency to defects in any given class of plates is in proportion to the liability of the sensitive film to being acted on by subtle chemical or mechanical influences or agents, as is exemplified in the broadest manner by the history of all the old dry processes, in which it was the rule that the quickest were the most marked by defects. The reason is not difficult to assign, for the chemical constitution, which yields most readily to the attack of the developer, holds its constituents in bond by a weaker attraction than does that which requires an energetic agent to separate them. In the albumen processes we were able to develop by a tallow candle without a screen of colour, while in the gelatine we require a light so veiled that in the old days it would have been considered impossible to work by it. And, practically, we know that the extremely rapid plates not only deteriorate more rapidly than the slow ones, but that, *cæteris paribus*, the quick plate is always more likely to fog and to develop accidental defects. I remember on an occasion when I wanted some plates of the most sensitive quality that I ordered a dozen of a well-known firm which were believed to be the quickest possible. I tried them with the utmost care and with various forms of development, but every plate fogged. It is on the principle of tobogganing—the hill you can go down most rapidly on when you want to slide is that on which you slip up most easily when you don't want to slide.

Of course, when you want instantaneous results it is necessary to get as close to the edge of danger as you can and not slip, and if there are defects make the best of them, using fresh plates (a precaution which is not always possible when in voyage, or when using commercial plates);

but when we have to make a time exposure in which the *desideratum* is quality of negative without regard to the instantaneous quality, and where it is *indispensable* that the exposure should be full, and *desirable* that the development should not be forced, the difference in the time of the exposure is of no commensurate importance, while the advantage of a restrained development and the greater freedom from structural defect, consequent on the more thorough action of the light, is so great that nothing to be gained by catching some object on the move is to be for an instant compared to it. And even in instantaneous work I think that we had better sacrifice something in the field if sacrifice must be made by using a quicker lens and a slower film. In short, instead of making it the rule to use the quickest plate we can get, it should be to use the slowest that will answer our purpose.

I sometimes amuse myself with detective work, but in all the serious photography I do, I find myself seriously hampered in it by the defects in the film consequent on straining for rapidity and large figures on the photometer. As I use only paper, I am obliged to beg Mr. Eastman to give us slower paper for ordinary work, from the difficulty of developing without defects the extremely sensitive film he sends me.

SPECTRUM PHOTOGRAPHY WITH ROWLAND'S CONCAVE DIFFRACTION GRATINGS.

By Lieut.-Colonel J. Waterhouse, B.S.C. (Assistant Surveyor-General of India).

Having lately obtained a Rowland's concave grating of about six feet focus, it became necessary to devise the means of mounting it for photographic purposes, and as information on the subject is not readily available, the following brief description of various arrangements for this object may be of interest.

According to the theory of the concave grating, as stated by Professor Rowland, the lines of the spectrum, formed by the image of a fine slit, come to a focus at a distance from the grating equal to its radius of curvature, and therefore if the slit, S (Fig. 1), the ruled surface of the

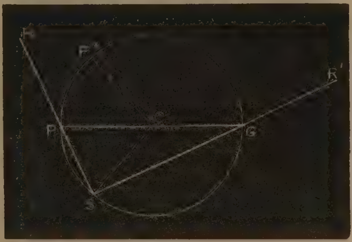


Fig. 1.

grating, G, and the eyepiece, or photographic plate, P, are always situated on the circumference of a circle, S P P′ G, of which the radii, G G, C P,

C P′, C S, are equal to half the radius of curvature, P G, of the grating, the spectrum will always be in focus at P or any other point, as P′, on the circumference of the circle. Moreover, when C P and C G are in the same straight line, the line of foci will be perpendicular to the direction of the light, and the spectrum will be normal at the point P, whatever the position of the slit, provided it is on the circle.

In Professor Rowland's arrangement, as described in *L. D. and E. Phil. Mag.*, Fifth Series, vol. xvi., 1883, p. 203, the slit is fixed and the grating and eyepiece, or photographic plate, are attached to the opposite ends of a bar, P G, whose ends rest in carriages moving along the rails, S G R′ and S P R, at right angles to one another. (See Fig. 1.)

This is an exceedingly simple arrangement. The slit remains fixed, and also the direction of the light, because the grating and slit are always on the same line, S G R′; and if a scale of equal divisions, representing wave lengths, be placed along the line, S P R, the eyepiece, or photographic plate, may be brought into position at once for the observation of any desired part of the spectrum. Scales for each of the superimposed spectra may also be placed along the same line, and will show immediately what lines are superimposed on each other, and their relative wave lengths, the whole of the superimposed spectra being in focus together.

It is obvious, too, that this arrangement can be very readily used with gratings of different focal lengths, provided the rails are long enough, and the camera or bar, P G, capable of the necessary extension.

It seems, however, better adapted for use in a permanent spectroscopic observatory or laboratory, where it could be fixed once for all in a dark room, rather than for intermittent work in a limited space, when it would be inconvenient to devote a special dark room to the purpose, or where portability and compactness may be an object.

Captain Abney has adopted a modification of Professor Rowland's, and has described it fully in his paper 'On the Solar Spectrum from λ 7150 to λ 10,000' (*Phil. Transactions Roy. Soc.*, vol. clxxvii., Part II., 1866).

In this system a plank, A (Fig. 2), carries the grating, G, with its

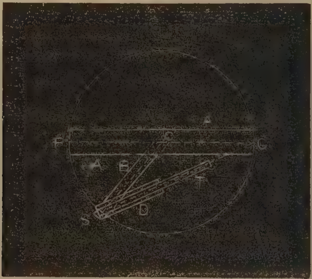


Fig. 2.

axis lying along the centre of the plank and the photographic plate at P, the distance, P G, being equal to the radius of curvature of the grating,

as in Professor Rowland's arrangement. At the centre, C, bisecting this radius, a plank, B, is pivoted, and at a distance, C S, along it, equal to C P and C G, a second pivot, S, is placed, on which a third plank, D, carrying the slit and its tube, T, can turn. The slit is placed exactly over the point, S, and the tube, T, can thus always be made to point towards the grating at G, no matter at what angle the plank, B, is turned away from A, and as S travels on the circumference of the circle of which the grating and the plate also lie, the diffraction spectra are always in focus, and the scale of the spectrum is invariable. It may be noted that as S approaches G, the tube, T, must be shortened.

In working with Captain Abney's arrangement I found it answer very well, but it was inconvenient to be moving the direction of the camera, and also of the slit, and after trying a plan of keeping the slit always in the direction of the ray from the heliostat along a fixed line, H S G, and bringing back the slit and grating to that line after each move of the camera, I have now adopted the arrangement shown in Fig. 3, by which,

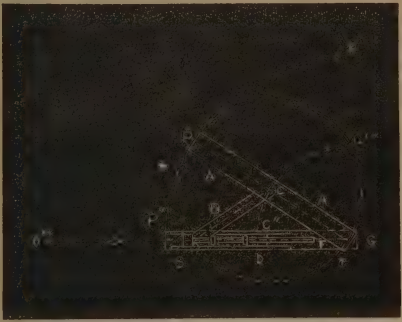


FIG. 3.

while the camera moves round a pivot placed under the centre of the grating at G, the slit attached to the tube, T, moves in and out in a groove along the line, S G, always in the direction of the ray of light thrown by the heliostat, H, upon the slit. By moving the camera at P along the arc, P″ P P″, the arrangement works automatically, the centre, C, of the whole system moving along a corresponding arc, C″ C C‴, so that the points, P G and S, are always on the circumference of a circle.

In other respects the arrangement of the planks, A, B, D, and pivots, C and S, is exactly the same as in Captain Abney's plan.

A few notes as to other details of the apparatus may also be worth recording.

At P the camera back is fitted with eyepieces, which serve for focussing or for observing by eye. They fit in a tube arranged to travel in slides up and down and right and left, so that it can be brought to any part of the spectrum in any position within the size of the photographic plate. At the suggestion of my colleague, Major C. Strahan, R.E., to whom I am also indebted for hints as to the pivoting of the camera, I had the eyepiece tube pivoted so as to have an oblique motion right or left, which

is most useful in observing extreme rays, especially when working with the prismatic spectrum.

The camera back is also fitted with sliding plates, by which all light is shut off from the photographic plate, except that from the spectrum, whether formed by prisms or the grating. The width of the image of the spectrum can also easily be regulated, so that several images may be obtained on the same plate. For this purpose the dark slide is moved up and down by rackwork, or by means of a slot and clamping screw.

One side of the camera has an opening in it about two to two and a half inches in width, and about three feet long, in order to admit the tube, T, attached to the slit, and enable it to be pointed to the centre of the grating. The aperture is closed by a sliding shutter, and by dark cloths arranged to shut off all light except that coming through the tube from the slit.

The tube, T, is supported by Ys, fitted with a screw adjustment for raising or lowering them, so that the tube may be levelled at the height of the centre of the grating and axis of the camera. A rackwork motion attached to the foremost Y gives the means of turning the slit round so that it may be made exactly parallel to the lines of the grating. This, as Captain Abney points out, is most important in securing a good definition.

A Hook's joint with a long handle enables the operator to make this adjustment at any position of the camera.

The tube, T, must be made in short lengths, jointed together, or sliding one within the other, in order that it may be lengthened or shortened as necessary.

It is essential that the grating should be in true adjustment, square and vertical to the axis of the camera, which should pass at right angles through the centres of the grating and of the photographic plate in its normal position.

The pivot at G is arranged to be exactly under the centre of the grating.

The slit is always kept vertically over the point, S, where the arm, B, working on the centre, C, is pivoted. When properly fixed, the tube, T, should always point towards the centre of the grating. The circle of light thrown by the slit is easily seen.

As the slit always moves in grooves along the line, H S G, scales of wave lengths of the different spectra can be placed along this line in the manner suggested by Professor Rowland, and thus readily show where the camera must be placed for each part of the spectrum.

Where, however, ample space is available, it would be better to place these scales along the arc described by the end of the camera carrying the photographic plate, the whole apparatus being placed upon a large, firm table, in which case it will be necessary to clamp down the plank on which the slit tube travels. Otherwise the latter can be fastened to a long, narrow table, while the plank carrying the camera works round the pivot at G, and is supported at P by a suitable prop. The whole arrangement can thus be closed up into a comparatively small space when out of use.

The perfect definition and detail of the photographed spectra obtained with the concave gratings are very superior to anything that can ordinarily be obtained with prisms, particularly in the less refrangible

end, and there is the further advantage that, working in the manner suggested by Professor Rowland, with the photographic plate normal to the grating, the whole spectrum is at once in focus, and there is no necessity for adjusting to minimum deviation, nor for differences of focus between rays of different refrangibility. Only small portions of the spectrum can, however, be taken at a time, on account of the curvature of the field, unless the photographic plates also are curved.

EYE *VERSUS* PHOTOMETER.

By A. Levy (Paris).

I am always disinclined to make trials, and manage to get along pretty well with my old plates and my old pyro developer. When I have a design to reproduce on white or bluish paper, I give it an almost instantaneous exposure—say half a second—and develop very strong, and I have contrast enough; but I have been thus far unable to account for the reason of *one* corner being sometimes lighter, consequently printing blacker than the remainder of the plate. Is it uneven coating? May be. But, then, why does this *never* happen on a negative exposed on a building or an interior? The plates I use register on the sensitomer nineteen and twenty-four. For outside views I generally give between ten and ninety seconds, according to light and colour of buildings, and I come out all right. I always use for outside views the smallest diaphragm.

Maybe there are photometers which are really useful, but I doubt this, for in a great many instances I have found several gentlemen using them with very uneven results. As far as I am concerned, I think the eye is the best judge. Now, for one instance, I went to Etretat, a seashore place, to take some views last September. On a very bright morning, just a trifle hazy, but in full sun, I exposed a plate on a brick building. An amateur just passing asked me if I was going to take an instantaneous view. In return, I asked him what exposure he would give, and he answered, 'One or two seconds.' I gave ninety seconds, and the result was splendid. That same day I saw taken on the shore, by an amateur with a cheap outfit, a view. I saw him focus on a small boat nicely balancing on a gentle swell. I saw him open the lens about one minute after the focussing was done, the boat moving meanwhile, and then giving fully two to three seconds' exposure, and seemingly feeling happy. I will only mention, *en passant*, that it was 5 p.m., hazy, and sun dead in front of lens. I ventured to question the result, but was sternly told that it was certain to be all right, the instrument not being an instantaneous one, and he was satisfied he had secured a splendid negative!

To return to the photometer. If I could get one—I mean a good one—I would be highly pleased. I have had lately several interior views to take, and it was a hard job to find the time of exposure. Some I gave ten minutes with plates of No. 19 sensitiveness, and some I gave as much as one hour and fifteen minutes on plates of No. 24 sensitiveness. Now what photometer will give me that time with any approach to accuracy? The focussing alone for such views is a hard job, and very often only got by chance. When my camera is put in position, and I can see the right and left top and bottom, I am all safe. I pin a newspaper in the centre

of my view on the wall, and focus on the *heading*, the only part I can discern; then I diaphragm down, open all the windows I can, judge outside light, colours in room, look what can be seen on the ground glass, and from that deduce the time I can or ought to give, and when I develop I come out right nine times out of ten; and as I never know which plate I develop next, if it is an exterior or an interior of ten seconds or one hour, there must be something in what I have always advocated, viz., if you have a good plate do not change nor make trials as long as the manufacturer gives you satisfactory plates. Use always the same developer, and you will be on the safe side as long as it gives you good results.

And last, but not least, using always the same plates and same developer, and knowing both very well, *expose* your plates for your developer, and do not develop your plates according to exposure, except in extreme cases, when a mistake has been made.

SUMMER PHOTOGRAPHY.

By Professor Coleman Sellers, E.D.

More than twenty-five years ago, when I was writing for The British Journal of Photography as its American correspondent, I published a paper on photographing in the mountains. Then the only dry plate we had was the tannin, but I worked wet plates in the field and tried to devise methods of doing so with comfort. This summer found me in the uplands without a dark lantern to use in changing the plates. I had left a very convenient lantern, purchased in England in 1887, at home. Necessity, the mother of invention, soon showed that a lantern can be quickly made if one will take with him a lot of orange-coloured tissue paper. I had taken two quires of this paper with me to use in covering any windows that I might find in rooms available for developing purposes. With a night taper and this paper one can improvise a lantern in short order. My favourite lantern now is the box in which I carry the camera. Standing this on end, with its top open like a door, I place the night taper in it, and over the front place three thicknesses of the orange-coloured paper. In a bedroom my foot bath, turned up on end, held the light when the box was not at hand. In fact, any toilet utensil large enough, either of tin plate or china, has at times been used as a lantern when large enough to hold the taper and small enough to be covered by the tissue paper.

My dark room this summer was in an unused stable, one part of which, full of cracks to let in light, was partitioned off with rough boards for the occasion. The window was covered with many thicknesses of orange-coloured tissue paper until it was of the right degree of darkness. The cracks of the room were quickly covered with old wall paper, selected from the rejected stock of the paperhanger, and bought for a few pence a roll. This wall paper is readily tacked to the woodwork and covers the cracks to the total exclusion of light. One morning's work made me a very good dark room, the door being made of a frame of plasterers' lath covered with strong hardware paper—such is the name here of the strong paper used by the ironmongers to wrap up their goods. In writing for

The British Journal Photographic Almanac from this side of the water one has to think of the words that will be understood by the readers in England. It was but the other day in Liverpool, wishing to go to a linendraper's, I inadvertently told cabby to take me to a dry-goods store, and he landed me at a place where cheeses were for sale. This comes from using one's native tongue in a foreign country. No matter how familiar one may be with English an American word may creep in.

HOW TO OBTAIN A SATISFACTORY RETURN FOR SILVER RESIDUES.

By E. W. Foxlee.

Complaints are still frequently made that refiners do not make so fair and honest a return for photographic wastes as they used to do years ago. This charge is often made without the slightest data upon which to form an opinion, except, perhaps, the weight, or even the bulk, of the residue itself, coupled with the amount received for it as compared with what used to be obtained for a similar quantity many years back. A little consideration, however, would show that photographic wastes must necessarily be far less valuable now than they were formerly.

At one period the paper was much more strongly salted than it is nowadays, and it was sensitised on a far stronger bath—sometimes double the strength of that now employed. Therefore, it will be seen that not only did the paper contain much more chloride of silver, but it also held a far larger amount of free nitrate than it does at present. Indeed, some of the ready sensitised papers now sold contain really very little free silver, hence there is not much to be recovered. Of course the ashes from the paper itself and from the albumen weigh just as much now as ever they did, while the proportion of silver is often less than half what it used to be under the old conditions of working. This, however, in itself, is not sufficient to account for all the wide difference of which some complain.

When highly sensitised paper was in vogue the value of metallic silver was much higher—the standard metal ruling then about five shillings per ounce, whereas at the present time it is but little over three and sixpence. But this is not all, where nitrate of silver is taken in exchange for the residue. At the period to which I refer the price of the nitrate (then a by product) was but a fraction over the value of the metal it contained; now the consumption of nitrate of silver is so great that what is obtained as a by product in 'parting' is no longer equal to the demand. Therefore it has to be made specially, and its price is now fixed sufficiently high to carry a liberal profit to the manufacturers. The price of the salt, as compared with the value of the metal it contains, is now several pence per ounce more than it used to be when the wastes were more valuable. Having pointed out why the residues themselves are so much depreciated in value, I will proceed to show how any one, without chemical knowledge, can ascertain for himself their exact value before dispatching them to the refiner.

In the first place, all the wet residues—the chloride from the washing waters and other sources, as well as the sulphide from the fixing baths—

must be thoroughly dried and reduced to powder. Then the cuttings from prints, old filter papers, &c., should be burnt to a fine grey ash. If a large quantity of these has to be dealt with the paper may be burnt in an open grate, and the ashes afterwards transferred to an old iron pot, placed on a fire, where they may further incinerate for some hours. Smaller quantities may be consumed in the pot in the first instance. The whole of the residue should now be passed through a coarse sieve to remove extraneous matters—broken glass, &c.—and then intimately mixed. A sieve, suitable for the purpose, may be extemporised by replacing the bottom of a cigar or similar box with a piece of coarse wire gauze or a piece of finely perforated zinc. We shall have now our residue in the smallest possible bulk, and in such a condition that its value may be ascertained with certainty as follows :—

Weigh out a definite quantity of the powder—say half an ounce—and mix with it half an ounce each of carbonate of soda and carbonate of potash. Then put the mixture in a small clay crucible of the kind known as a ' skittle pot,' and subject it to a strong heat. Sufficient heat to reduce such a small quantity as we are now dealing with may be obtained in the domestic kitchener, with the flues fully open, or in most good drawing stoves, particularly if a blower be placed in front of the chimney to increase the draught. The contents of the pot must be kept boiling, care being taken that it does not boil over, until it acquires a quiescent appearance, while the heat is still being maintained. This may take half an hour or more, according to the temperature. When this quiescent appearance is assumed the operation may be considered complete. The pot is then removed from the fire and allowed to cool, It is then broken, and the metal, which should now be in the form of a clean, white, smooth button, weighed, and from its weight the quantity of metal in the bulk can be ascertained. The residue, after weighing it, can now be sent to any respectable refiner.

When I have prepared the residue in the way I have mentioned, and I have ascertained its value before sending it, in my experience the return made by the refiner has always been *satisfactory*.

PRINTING TOO INTENSE NEGATIVES.

By W. H. Sherman (Milwaukee, Wis., U.S.A.).

It not unfrequently happens that a negative is made, which by reason of too great contrast between the light and dark parts will not yield a presentable proof if printed in the customary way, which may, with suitable modifications of the printing bath, or of the silvered paper, be made to give, to say the least, excellent results; in some cases even equalling the best obtainable from negatives of the most approved qualifications.

There are also negatives which approximate more nearly to the standard of technical perfection, but which, although vigorous and full of detail, are too brilliant in the half tints, and tend to give the frosty or snow-like effect so often seen in landscapes, notably in stereoscopic views, and the chalky appearance noticeable in some portrait work. From such negatives it is not difficult to obtain quiet toned and har-

monious prints instead of the flashy, low grade products consequent upon adhering to a fixed mode of procedure.

The grade of excellence to which a negative belongs is not always correctly determined from the standpoint of a sixty-grain printing bath. From this exclusive point of view, many a valuable negative would be condemned as worthless. Neither is a printer a thorough expert who is unable to utilise to advantage many other negatives besides those which answer favourably to the requirements of his one favourite formula.

A printing bath of the strength of fifty to sixty grains to the ounce contains a large excess of silver above what is necessary to convert all the soluble chloride in the albumen paper commonly used into silver chloride, and the albumen into silver albuminate. Broadly stated, the greater this excess the more vigorous are the prints from a given negative. The stronger the bath the greater will be the quantity of free silver nitrate on the silvered paper; and this greater quantity of silver is the only obvious difference between paper silvered on a sixty-grain bath and that silvered on a thirty-grain bath. If this were actually the only cause of the difference in the printing quality of the two baths, all that would have to be done to reduce the printing vigour (that is, the quality which gives strong contrasts) in paper silvered on the sixty-grain bath to the low printing strength of the thirty-grain bath, would be to wash out the excess of free nitrate in the former.

In practice this plan does not succeed as well as might be expected. But by floating strongly silvered paper on plain water for several minutes, thereby removing nearly all the free nitrate, it is greatly improved for printing negatives which are too intense, but not excessively so. If instead of plain water that which contains two or three grains of silver to the ounce be used, a negative somewhat less over intense may be successfully printed. (The water in which a day's printing is first washed may be saved for this purpose.) In this plan the paper is all prepared alike, so much as is required being afterwards washed for the exceptional cases as they present themselves.

But sometimes a negative comes to hand which cannot be satisfactorily printed by either of these devices. Such are negatives of which when the shadows and half shadows are fully printed, the half tints and high lights are less than half printed.

Considered in relation to the generally approved silver bath, these negatives are simply waste glass. Old negatives, made two or three decades ago, from which duplicates are wanted, are sometimes found to be in this condition.

The best way to manage such refractory cases that I have been able to discover or learn, after many experiments, is as follows:—

Make a solution consisting of

Nitrate of silver	480 grains.
Water	16 fluid ounces.
Alcohol	8 ,, ,,

This, as will be seen, makes a twenty-grain bath. Float the albumen paper on this five or six minutes (this precaution being necessary to prevent mealiness), and print in bright sunlight. This will give a beautiful, soft print from a very hard, intense negative, such as described above.

It is advisable to cover the dish while the paper remains on the bath, to prevent evaporation of the alcohol.

This strength of the silver solution appears to be as near as possible to the *minimum* of that required by the quantity of salt used in the best brands of albumen paper now in common use.

MISCELLANEA PHOTO-MICROGRAPHICA.

By Andrew Pringle.

Almanacian readers, whose photography is general rather than special, may be disappointed that I do not add my quota to the large amount of general photographic information that will, doubtless, be provided in the jolly old Annual, which is getting fatter—or stouter—every year, without showing the slightest sign of 'degeneration.' But as you can expect from a sow little better than a grunt, so from the photo-micrographic monomaniac one may be prepared for a certain amount of raving.

I often hear a great deal said, and see much written, about the necessity for staining objects with a special view to photo-micrography. At one time I myself believed that if the best results were to be obtained from physiological and pathological preparations, it was necessary to single stain the preparations with some colour 'amenable to photography.' When I started physio. and patho. work, I always caused my preparations to be stained in one of two ways, and even procured specimens mounted *au naturel*—that is to say, unstained. The latter freak of mine did not last long, though the objects were prepared *cum grano salis*. Not many months ago I undertook to try to photograph a set of pathological preparations, and as a preliminary experiment I had fourteen or fifteen sections stained in different ways: single stains of yellow, carmine, magenta, logwood (which can hardly be called a single stain on account of the different colours it produces in different tissues), gentian, violet, &c.; the usual double stains—logwood and eosin, logwood and magenta, &c.; and one or two triple, or quasi-triple, stains. After a not very protracted course of experiments I rejected all the single stains, all but two of the double stains, and gave preference to a real triple stain, viz., Ehrlich's, consisting of hæmatoxylin, which is caused to take a fine blue colour in the tissues; acid rubin, a 'blazing' red; and orange, which stains certain tissues to a peculiar almost 'washed-out' brown-yellow colour. Strange as it may appear to those who have so long clamoured for one-stain preparations, and that stain Bismarck brown, logwood, or violet, it is none the less true that with Ehrlich's triple stain I got by far the best representations of the pathology of my preparations. Pressing on further, I 'took lessons' in the stain under an able master, and I now stain physiological and pathological subjects alike with 'Ehrlich,' and so much superior to other stains for my purpose do I find this one, that I prefer to get or cut plain sections and stain them myself, rather than to buy or accept sections ready stained by other processes, and mounted never so beautifully, with the most artistic and elegant series of black, white, and gold rings all round them.

Now, there is no denying that the photography of sections stained blue, red, and 'orange,' is difficult. Of course it is; but what matters difficulty if the result is superior to all others? I am not saying that

my results are superior to all others ; I dare not say such a thing, whatever I may think! What I say is, that a man better up in colour-correct photography than I am would, with my stain, produce results superior to all others ; but he would require to spare no labour and no time, and not much expense. The tints taken by different tissues, in different states and stages of disease, and the incredible variations produced by varying thicknesses of the sections, preclude all idea of instant or easy success, but I repeat that when success is attained it is worth all the trouble, and far more.

In the first place we require plates 'dense' and plates 'thin,' plates proportionately extra sensitive to red, orange, and even to violet and blue sometimes. Many a time I have had to deal with dark masses of blue or violet, less chemically active than the reds and yellows around them, to such an extent that I could not with ordinary means get the blue or violet exposed sufficiently before the reds and yellows were fogged. This condition had to be met by unusual kinds of 'screens.' This leads us on to the question of screens, of which a considerable number and variety are required—yellows, pale reds, blues, and greens.

Want of space precludes the idea of entering into anything like full details of my attempts to achieve success. A few general examples must suffice. When I found the blues and reds nearly equal in my subject, I found a yellow screen and an eosine commercial plate suitable, oxy-hydrogen light being used throughout my work. If the reds were very pronounced, and if detail was requisite in the red, an azaline commercial plate (with a yellow screen as a rule), was found best; once or twice I had to take to cyanin, using Mr. Ives' last published method, but this was such very ticklish work that I avoided it when I could. Cyanine means, practically, groping in the dark room.

Once or twice, when very dense violets or blues had to be detailed beside very faint reds, a signal-green glass recommended by Dr. Bousfield came in handy. A good many cases were found where there was little more than a mass of red tissue, so stained as to show plenty of detail; such cases were met by azaline plates without any screen at all, the exposure in some instances being well-nigh incredible. One such subject was exposed under these conditions for fifteen minutes to my limelight, and it was rather under exposed even then.

When the prevailing colour of a section is red, and that red a pale one (due to understaining with the red), there is a frequent difficulty in procuring contrast between subject and background. Of all the reds with which I have had to deal, eosine is the most puzzling, for it seems a mixture of blue and red, and one never knows how to treat it. But it is one of the best stains for many tissues for ocular observation, and very many preparations are stained with eosine. The green screen and a yellow sensitive plate have with me answered best for such preparations. To conclude this series of remarks, I will say, that by experiment only—by experiment, careful and prolonged—can anybody ever expect to master the subject of colour-correct photography. Prepare a specimen so as to get the best visual effect, and then kick over difficulties and photograph your microscopic subject; you have then not only the best photo-micrograph, but the best preparation in your cabinet.

A substage condenser may certainly be used as an appliance for shedding a blaze of light upon the object, but that is not its aim. A

condenser is intended, and should be used, to focus the radiant on the object, so that the latter lies precisely in the conjugate foci of the condenser and the objective. If a bull's-eye is put between light and condenser so as to parallelise the rays falling on the condenser, the condenser is no longer a proper condenser, and cannot, in fact, be focussed. If the radiant surface alone be not large enough to cover the 'field' evenly at the power used, a bull's-eye may be used to parallelise the rays upon a sufficiently large disc of very finely ground glass, or on a thin cell of some such liquid as milk and water; with the ground-glass disc the condenser can be very nearly focussed, though not accurately on account of the grain of the ground surface; but anyhow, the result is likely to be better than with a bull's-eye alone between light and condenser.

Sometimes an unaccountable difficulty is found in low-power work in getting sufficient contrast between certain pale-coloured objects and the background; in such cases the light should be cut down as much as possible without loss of resolution.

Anything in the shape of a stop that may be found at the back of an objective should be removed; such a stop may hide, but cannot prevent defects. Whatever stopping is to be done should be done behind the object; that is, between object and light.

On no account should any object, however simple, be photographed, with or without ocular, before it has been most carefully examined with an ocular in the microscope. For my own part I never expect a perfect photograph of an image projected by an objective alone, but I must have a 'projection' ocular or none. But my experience is that *very good* photographs can be produced without an ocular; if an ordinary ocular, Huyghenian or achromatic, projects on a screen a perfect image for photography, I can only attribute it to a good luck that has never yet come my way, though I have tried many oculars.

I have more than an idea that vast strides of advance are in store for photo-micrography. The steps will probably be: knowledge of colour—correct methods; wide-angled objectives, corrected for three spectrum rays ('apochromatic'); and proper use of the substage condenser.

FINDERS ON DETECTIVE CAMERAS.

By S. W. Rouch.

I have noted what has been written and spoken concerning the advantages of finders on cameras of the detective class. I quite admit that some, like our editor, can hold up a camera and take a shoulder shot, infallibly placing their principal object dead in the centre of the plate every time. But this necessitates elevating the camera to the level of the eye, which is certain to arrest the attention of those whom it may be specially advantageous to keep in ignorance of there being a photographer moving in their midst.

For real detective work the camera should not be elevated higher than its position when carried under the arm, when the relative positions of the figures can be seen by casting the eyes downwards upon the ground glass of the finder. Thus, not only can the chief subject of the group or scene be placed correctly on the negative plate, but the precise amount of scene that will be included will also be ascertained, that is, provided the

focussing screen of the finder be in the same ratio to its lens as does the sensitive plate to the lens by which it is to be impressed.

I have recently had placed in my hands twelve dozen shutter-exposed negatives taken in Persia and the Russian Caucasus. There is not one (although many are architectural subjects) which shows any of the faults usually found when the camera is carelessly placed. All the series were taken with an Eureka detective camera held under the arm, the manipulator finding that, by fixing his attention on the finder while taking a group, not the faintest suspicion attached to his movements. With the same camera, when placed on an Alpenstock tripod for a *time* exposure, it was found easy to take well-selected pictures by trusting entirely to the finder, and consequently doing away with the discomfort attending the use of a focussing cloth, besides the saving of time and temper.

The lens must be adjusted to work for ordinary views at fixed focus, while for very near objects, portraits, &c., a scale attached to the camera permits of an adjustment being made with perfect accuracy. It was a very common practice in years gone by for artists to employ two cameras and lenses identical in focal length, one to be used as a finder for the other. My impression is that, although not strictly *necessary*, no hand camera is perfect without this addition.

The advantages of having a shutter arranged to work behind the lens is that it is possible to insert a diaphragm in the lens, a very necessary thing to do when working in tropical climates, to avoid over exposure.

AMMONIA FUMES.

By J. Watney Wilson.

'One man's food another man's poison.'

Why ammonia affects some operators more than others I account for in the following way, going so far as to say that in extreme cases it is beneficial up to a certain stage, but beyond that injurious :—

Some years ago I painted the portrait of a celebrated physician (a veritable Luther in medicine), who had originated a new ology, calling it 'Glossology,' or the study of the tongue, and in his writings he proves (and from my past experience conclusively) that most of our ailments appear during an excess of alkali or acid in the body, more frequently the latter, and therefore I have always likened the human system to the photographer's bath, it working best with a slight excess of acidity. The tongue is the litmus paper and indicates, when it is a deep red, an inflammatory action with an excess of alkali, the depth of tone varying in accordance with the amount of fever present, &c. To correct this, the doctor should pour in the cooling acids, opiates and restrainers; development is going on too rapidly. But, when the tongue is white, furred and coated from congestion, the alkaline accelerators should be given.

When I enjoyed (?) a short period of professional photography, and had been shut up in the dark room developing a batch of under-exposed plates with ammonia, for say an hour, I always returned home seriously ill; yet one of my assistants seemed to enjoy and to thrive upon these to me deadly fumes. Unfortunately, I am prone to the inflammatory stage

with an *excess* of alkali, a glary red tongue indicating the same, having to take large quantities of acid, lemonade, &c., and dare not touch anything stronger than porter. As for my assistant's piece of litmus paper, his tongue was invariably coated, showing an excess of acid; consequently, the ammonia helped to correct this, and he laughed at the idea of any one being upset by the absorption of ammonia, failing to realise that every body contains various chemical elements, and as either the alkali or the acid preponderates, so is it affected by what it absorbs. The healthy neutral tongue should be of a pale pink rose-leaf colour.

I have frequently proved this theory by practising upon sick friends, prescribing entirely from the indications given by their tongues, and always to their benefit, helped by the advice and works of the aforesaid physician. Should any of your readers wish to save their guineas, I will give with pleasure, in the answers to your weekly correspondents, a simple prescription, containing acids, opiates, &c., for their red tongues, and alkaline 'pick-me-ups' for their furred and bilious systems.

OBTAINING EFFECTS.

By Professor Stebbing (Paris).

Having been burnt out, and, therefore, nothing to do for the last two years, I cannot send any laboratory dodge likely to be of use to the numerous readers of the Almanac, as was my wont. So I must endeavour to describe how a certain coloured photographic print is obtained, by which many young and would-be artists gain a respectable living here.

A landscape negative is chosen, and slightly printed from on a sheet of albumenised paper, so as to have a slight image. Naturally the print is fixed and well washed. When dry this print is coloured according to the taste of the artist; the colouration is left as brilliant as possible. A film positive is now printed from the negative, and is made to adhere to the coloured print. The two combined make a very artistic picture, and obtain a great sale.

The demand is so large here that some enterprising chromo-lithographers obtain the coloured print by mechanical means, and are thinking of organizing a Woodbury printing establishment in order to procure mechanically the transparent positive film they require. May some of the readers of the Almanac be benefited by this process, which can be worked at home during the long winter evenings.

PICTORIAL PORTRAITURE.

By Edward Dunmore.

As a contribution to this excellent yearly Annual a few words on pictorial portraiture may not come amiss. We may assume that something more than a mere portrait is requisite to make a *picture*, as this, unless combined with something harmonising with, but independent of the portrait, can hardly be classed under the title of picture. *Imprimis* all must agree that it is necessary to have some idea of pictorial art, so far as it applies to photography, before we attempt to make a portrait combine with such

surroundings that will satisfy a longing for picturesque, refined treatment. There are not many ways in which it can be done; perhaps only two—one to combine the portrait with landscape, and the other with home life or interiors. H. P. Robinson has shown us how to do both successfully, perhaps more so than any one else in a broad and pleasant fashion, in distinctly different but equally satisfying manners, as his numerous exhibits have testified. Adam Distin and others have shown us how to pictorially combine portraits with interiors, and Edge with landscape, who, although one of the earliest, if not the first, worker in this direction has never, in this particular way, been excelled. It goes without saying that time and care are required to bring such attempts to a successful issue. The time, however, will not be with the model, but in the printing processes. A shaded background as a fixture, and a foreground that can be a little altered from time to time, but consisting of *actualities* and not stage properties, are all the studio conditions required; a number of suitable landscapes, thin and quick printing, complete the plant. All the rest depends on the amount of brains and dexterity possessed by the printer. The combination of portraits with interiors is much more difficult than with landscapes; much care is required in selecting a suitable interior negative. It rarely happens that the photographer has the opportunity of taking his model in a room that will lend itself to the ideal of the artist; in fact, very few rooms are suitable from a photographic point of view (this must not be confused with merely taking portraits, for which scores of rooms are suitable), the consequence is, combination printing has to be resorted to. The late Mr. J. Hubbard was a capital exponent of this class of work. Rejlander was one of the pioneers of composition printing, and his ability in making a portrait into a picture was exceptionally good. His wonderful skill in giving a motive to his portraits always removed them from the common-place every-day style of portraiture, and elevated them to the rank of pictures, and this with very little in the way of accessories. If he had a group to take, he was not contented with ranging them symmetrically, like apples on a stall, but devised some occupation for all—a large group would be divided into smaller ones, each small group was a point of interest, and the whole harmonised into the larger one, the result was a happy and picturesque arrangement. This may be deemed impossible when large numbers of persons have to be taken in a group; but this is only so owing to two causes—the short time or conditions available for making arrangements, and the want of artistic perception in the photographer. I have seen a group of ninety most effectively arranged, as at a picnic, and all fairly defined, and this with wet collodion; the skill exercised in grouping so large a number without any stiffness or formality showed how large numbers could be effectively treated by the exercise of due skill. With small numbers, say less than a dozen, there is no reason whatever why the poor, symmetrical, want-of-idea sort of grouping should not give place to something more artistic. As an aid to grouping, it is a good plan to carefully work out at home, with a pencil and paper, ideal groups of different numbers. Such diagrams would be found useful in forming the arrangement of the real groups when there is little time for placing the figures, and most photographers know that much shifting about and arranging militates much against a successful result—the models get fidgety and difficult to pose. Prompt decision is therefore an important qualification in the operator,

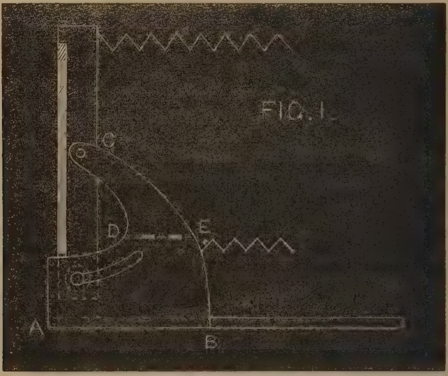
and if he goes mentally provided with groupings he has an infinitely better chance of producing artistic work.

For the production of pictoral portraits with landscape backgrounds, no plan is better than that devised by Mr. Edge, which, of course, necessitates double printing; the figure and foreground are taken in the studio with a light-shaded background, a print is made, the figure being masked and a suitable landscape printed in—that is all. To introduce a figure into an interior requires the same manipulative skill, but more judgment. The form of the room, the lights and shadows, have to be most carefully considered with reference to the portrait. An interior may be very pretty and effective by itself, but when partially covered with the portrait, all its prettiness may vanish, patches of light fall in wrong places, and sharp lines interfere with the lines of the figures—all these must be looked to, or the attempt will be most disappointing. Foliage plants are most useful when not overcrowded, and a folding screen is a capital accessory; but a jumble of accessories, no matter how good in themselves, are the bane of many otherwise excellent portrait pictures. Whether a landscape or interior is introduced it must be kept subordinate to the figure. Artistic refinement should permeate all pictures, for without it none will give pleasure and satisfaction.

A NEW SWING BACK.

By H. H. O'Farrell.

Some two years ago, when reading a paper at the Camera Club on modern cameras, I dwelt on the disadvantage of what I may call the McKellen type in the matter of the vertical swing. I insisted that it was most necessary that the camera back should pivot on its centre, or thereabouts,



The Camera Open.

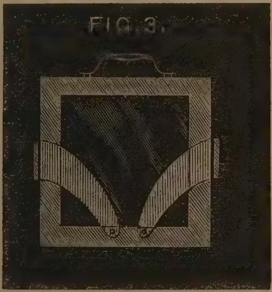
rather than be hinged at one extremity to the baseboard. This view was generally accepted, I think, at the meeting, and since that several of the modern makers have introduced cameras with a vertical central swing.

I give a rough design of an arrangement for this purpose which

seems to me simple and effective. The figures, I think, explain themselves. It is only necessary to say that the arm, A B C, is hinged at D E, and that when open it is made automatically rigid by a spring snap, such

THE CAMERA CLOSED.

as is used in travelling or pocket inkstands. When the camera is folded the hinged arms lie flat over, and partially protect the ground glass as in Fig. 3. I have not complicated the drawings by showing the side swing, which, however, can be as easily obtained in this as in any other



THE CAMERA CLOSED (TOP VIEW).

form of camera. It should, I think, preferably be effected in the old manner, *i. e.*, by dividing the back, as this method involves no strain on the pivots. The camera should have a spring pivot at *a* (Fig. 2) which should snap into position at C (Fig. 1) when the camera is opened.

VERY FINE GROUND GLASS.

By P. SWANSON.

'THAT is one of the finest focussing screens I have ever used!' was the remark one of my operators made to me the other morning. The ground glass which he referred to was that of a whole-plate camera. It was made from a spoilt whole-plate negative in five minutes, and, thinking that the manner of rapidly grinding glass to a very smooth surface might interest some of your readers, I here subjoin the *modus operandi*.

First procure a circular plug of lead three inches in diameter, and, say, three-quarters of an inch thick; file one of its sides smooth; then

take some of the very finest emery powder and shake it up in a solution of common washing soda, or in water with a little ammonia added. The reason of this washing is that emery powder when bought is often greasy, so we must first saponify the grease in order to be able to separate any particles of grit that may have accidentally got into the emery. Any rough particles would cause deep scratches which would take long grinding to get them out. Therefore, after having stirred the emery for some time in the alkaline water, it is allowed to settle in a tall bottle. When settled, pour the water off, and take a little of the emery paste off the top, apply it to the plug of lead, and begin rubbing the piece of glass in circles. During the process of grinding a little soap and water (*not oil*) should be poured on the glass occasionally. Five minutes' grinding will give a much finer surface than anything I ever purchased at the shops.

Ground glass is useful for many purposes in photography, and I would advise photographers to utilise a lot of old negatives and to have a stock of various sized pieces.

If a negative has to be enlarged or reduced a piece of ground glass placed behind it equalises the illumination.

A thin ghost of a negative requires to be printed; one, two, three, or even more thicknesses of ground glass placed in front will do much to improve the quality of the print. Or if any shadows print too harshly it is very easy to soften them on the ground glass, or even to grind the clean side of the negative.

'WHAT ON EARTH IS THIS?'

By J. A. D. Lloyd, Assoc. H. Inst. C.E.

That! That is my 'Bipod,' and a first-rate dodge it is for keeping the camera steady in a breeze. You know I went to Madras purposely to get some seascapes, and not a single exposure could I secure, owing to the high wind that was blowing. The waves were breaking clean over the breakwater, a most magnificent sight, such a chance I shall probably never have again. Well, on my return I dodged this up. You see it is made out of two half round strips of teak (a split bamboo would probably be better), which, when brought together, form a famous walking staff, four feet six inches long, one inch diameter at the large end, and three quarters of an inch at the smaller. A screw bolt, with a 'butterfly' thumbnut passes through the large end about one inch from the top, and forms a pivot on which the two legs open out. Between them is a brass plate, six inches long, one inch wide, and one sixteenth of an inch thick, with a long slot cut out of the centre, like one of the side stays of a camera. The pivot screw passes through this slot, and the thumbnut tightens all together. A V-shaped hole is made in one end of the brass plate, just large enough to admit the head of a small screw I have fixed in the front edge of the extension frame of my camera. Each leg is shod with a pointed thin steel plate, and they are kept together by a leather grummet, or ring, which slides off and on.

After the camera is set up and focussed I open out the legs of the 'Bipod' and set it firmly up in front of the camera, and drawing up the brass plate (the slot enables it to move every way) to the required height, I insert the small screw head above referred to in the V-shaped hole of

the plate, so that the neck of the screw is wedged in the V, then a turn of the thumb nut makes all tight. My camera is now on five legs, and is quite rigid, the bipod being beneath and attached to the (otherwise) unsupported end. When using high-speed shutters, which all more or less are apt to cause vibration, or when using long-focus lenses, with the camera racked well out, I find it simply invaluable.

I attribute the great rapidity of plates in India, about which several letters have lately appeared in print, to excessive actinism, *not* to increased rapidity of the emulsion. On the contrary, I have some 'drop-shutter' plates, imported some years ago, which have so decreased in rapidity as to be now equal to 'ordinary.' The following will give some idea of the actinism one has to allow for out here :—Landscape and foreground, bright scene : time, 7 to 8.30 o'clock a.m.; stop, U.S. 64; plate, Ilford ordinary; exposure, one second. Group: diffused light; time, 5.30 p.m.; stop, U.S, 64; plate, Ilford rapid; exposure, one second. Street scene: sunshine; time, 7 a.m.; stop, U.S. 16; plate, Ilford rapid; exposure, one twenty-fifth of a second.

Working on the theory that the longer pyro developer retains its clearness the longer it retains its activity, I find, as the result of over one hundred experiments, that acid in the pyro solution is no preservative against it turning brown and muddy after it is mixed with the alkali, on the contrary, that it hastens decomposition. I have therefore discarded all acid, and use *dry* pyro. It is simply astonishing how accurately one can, after a little practice, take up two, four, or more grains from the bottle on a small spoon or slip of glass.

For accelerator I use in cool weather (F. 55° to 75°) a ten per cent. solution of carbonate of potash made up with a one in four solution of sulphite of soda (instead of with plain water). In very hot weather (F. 75° to 100°) I increase the sulphite of soda by adding to each ounce of developer up to forty minims of a one in four solution. This is a remarkably powerful developer, and remains clear a long time. Half an hour after adding the pyro (dry) it assumes a faint brown-madder tinge only. One grain of potash (ten minims) in hot weather, and two in cool, to each ounce of developer is generally sufficient to bring details up to full printing density. It also gives as clear shadows as can be wished for. A few drops of a ten per cent. solution of bromide of potassium, not exceeding four to each ounce of developer, will give extra contrast if the subject should require it.

PRINTING TROUBLES.

By J. Vincent Elsden, B.Sc., F.C.S.

Although Hardwich and, later, Eder have given a complete *resumé* of the chief sources of failure in positive printing, it appears to me that a brief recapitulation of these troubles may be of use to many readers of the Almanac.

I need not dwell upon the results of imperfections in the negative, as it is evident that weak or over-dense negatives, as well as fogging, spots, and markings, will all impress their imperfections upon the positive print.

Mealy prints may result from the use of old paper, or of an unsuitable

kind of paper. The best cure is to soak before toning in a weak solution of acetate of soda. This fault seldom occurs with plain salted paper.

White marble spots are due to insufficient silver nitrate in the sensitising bath, or to too short an immersion in the bath.

Black marble spots are caused by a reduction of the silver salts, owing to mechanical impurities on the surface of the silver bath. To remedy this, a strip of blotting paper should be drawn gently over the surface of the bath, so as not to touch the bottom.

Black spots, visible by transmitted light, are due either to imperfect fixing, or to metallic specks in the paper itself.

The whites appear yellow when the toning or fixing bath is acid, or when the fixing is too prolonged or the paper kept too long after sensitising.

The prints do not tone readily owing either to exhaustion of the gold bath, bad paper, cold weather, or iodide of silver in the silver bath. The print becomes pale in the hyposulphite bath when the chloride of silver in the paper is in excess of the free nitrate. This evil often occurs when paper is kept too long after sensitising. The paper repels the silver solution in the sensitising bath when the albumen is too dry. The print appears of a matt red colour when removed from the printing frame when too weak a silver bath has been employed.

Reddish brown spots and streaks appear after toning when handled by unclean fingers.

Blisters appear after fixing in some cases. These may be due to several causes, such as a thick and uneven layer of albumen, the development of gas bubbles owing to acid baths and hard water, too strong a fixing bath, or incomplete coagulation of the albumen.

PHOTOGRAPHY APPLIED TO ENGINEERING.

By H. J. Gifford.

As winter comes round each year we are reminded of the fact by a request —I might almost say a command—from our jovial editor that we are to give him an article for that useful Almanac—nay, I ought to say handbook —of his. After racking my brains, I have come to the conclusion that I cannot do better than give him a few remarks on the above subject, more especially as I have had during the past year to turn my attention to this class of work.

I do not intend to go into the subject in a thorough and exhaustive manner, as that would require many times the space which I may occupy, but merely to give a few hints to those who may be called upon to do the same class of work.

In chronological order, I ought first to mention the blue processes, which are used for multiplying drawings, and which are of great use to the engineer in saving time. Then comes the reduction of drawings to a given scale, as so beautifully exemplified in the ordnance department of this country. Of these processes, which really belong to the specialist, I do not intend to speak, but of photography, as it comes within the reach of every engineer and helps him in his practice.

The first class are views which remind him of places and works which he has visited, and help as a guide to his memory in forming his opinion

or framing his report on works executed or about to be executed. This class of work requires no special outfit, two lenses, a wide angle and a narrow angle, being all that is necessary. In this class comes photographs of property, close to or under which works are being carried out, in order to judge of damage done or alleged to have been done, as well as views taken for the purpose of alleging facts.

The second class are what are called progress photographs, and are taken to show the state of the work at a certain date. To do this class of work properly you require a fairly large battery of lenses, and in most cases, if the work is to be of any real use, it ought not to be smaller than 10×8, as under that size the details are not distinct enough, at least to the inexperienced eye. I have found that a 12×10 is the most convenient size, taking into account ease in transport and usefulness in result, though the latter is the more important, and with that size I carry a battery of six lenses, viz., 7, 9, 11, 14, 19, and 25 inches focus. With these I can get almost everything, though sometimes I would be the better of a shorter focus lens, if it were possible to get one.

My *modus operandi* is as follows:—I go round with the chief, carrying my $7\frac{1}{2} \times 5$, and see what is to be done, taking whatever that size is suited for, and carrying lenses from 5 to 15 inches focus, and at the same time observing the light and noting the points where the 12×10 is to be used. I afterwards get one or two staff holders, and go round with the large camera and get the views required.

In this class I include reduced copies of drawings to no specified scale, which are sometimes taken to facilitate preservation.

Thirdly, I want to mention a class which I should like to see making more way, or rather being introduced into not only our scientific societies, but also into parliamentary work, and that is the use of the optical lantern instead of the unwieldy and cumbersome cartoons at present in use and to be seen decorating the committee-rooms. Many engineers do not seem to be aware that a lantern slide can easily be made from almost any drawing, is very much more easily carried about than a large cartoon, and is, probably, more accurate, without taking into account the difference in price.

Photography is also used for representing pieces of machinery and for advertising purposes.

BALL AND SOCKET CAMERA STANDS FOR INTERIORS.

By Horatio N. King.

A suitable stand for interior work I have never felt the value of more than this season. Want of sunshine has doubtless kept many indoors who would have preferred a peep at a landscape through the ground glass of a camera; a good spell of interior work this year has been my lot. Noticing others at work with their apparatus, the majority of stands used being totally unsuitable for such work, I think a hint on one of the right sort may be of service.

Some thirty years or more ago, I purchased one of Gaudin Brothers, Snow Hill, but since then there have been many changes made in it. A description of one, to a certain extent similar, but in a greatly improved form, will help many who have occasion to photograph interiors, ceilings, and out-of-the-way corners.

The legs are adjustable from 4 feet to 7 feet, and with ball and socket movement, by which the camera can easily be placed at an angle of 45°. If you lower one or more of the legs you can place the table or cradle in a vertical position. I found this recently a very great convenience in photographing the roof of Henry VII.'s Chapel, Westminster Abbey, sitting quietly on the floor, with legs between the camera stand, and admiring the magnificent roof. This position may not appear a very dignified one; it has, however, its advantages.

The stand, by means of thumbscrews, is kept perfectly rigid, even on a polished or marble floor; but I always take the precaution of securing a bung at the bottom of each leg as a preventative against marking the floor. To those who have not a stand of such description this wrinkle may often save their camera from slipping. Another advantage of the stand is, that by means of the ball and socket movement you can adjust your camera in any position with perfect safety, and by setting the legs at any height, whether on the roof of a house, or looking at the roof from a seat on the floor, I know of no more useful article. Again, the ball and socket top is easily removed and another triangle substituted for ordinary work.

One bit of advice. If you want a stand for a 12×10 camera weighing about 1 lb., don't get this. In deal it weighs $6\frac{1}{2}$ lbs., in oak $10\frac{1}{2}$ lbs. Mine is the latter, and I frequently carry this with a 12×10 camera and three double backs many a mile in a day, and never feel better in health than when touring with such.

Somebody said at one of the societies, 'a man must be a Hercules' who could carry a 12×10 camera; well, I cannot lay claim to anything of the kind. I have never weighed 10 stone in my life, but I have worked hard at photography for over 40 years, and thoroughly enjoyed it. What is it? Are some of those practising photography at the present time afraid of work, or are they differently constituted? It may be they are not always 'early to bed and early to rise.' I have, however, raised the camera stand 'very early in the morning' both to sea, sky, and ceiling.

CHARACTERISTICS OF LENSES ADAPTED FOR PORTRAITURE.

By Fred. A. Velasco.

One of the first difficulties that presents itself to the intending photographer, whether tyro or veteran, on embarking in a fresh branch of the art, is the selection from the maker's list of an instrument that will best answer his special requirements. This is particularly the case with the small professional starting in the provinces, who needlessly drains his slender purse in remedying initial errors induced by a want of knowledge of the kind of work each type of lens is best adapted for. A clear understanding of the purpose and scope of the several forms adapted for portraiture now extant may, to some extent, prevent both vexation of mind and loss of cash from this cause.

The fact that provincial photographers frequently take long journeys to town in order to obtain definite information on this point has suggested the idea that a few concise remarks on the subject may not be unsuitable matter for the Almanac.

Portrait Lenses, as the name implies, are intended simply for the purpose of portraiture, but they are occassionally useful when enlargements are required. The principal feature is their extreme rapidity, and to this end every other quality is subordinate; consequently, disadvantages in the form of shallow focal depth, rounded field, and small covering capacity must be met and neutralised by skilful manipulation. Working with an aperture of one-fourth of the focus, they have been adopted as the unit of the standard system, and are technically termed $\frac{f}{4}$, or U.S. No. 1.

Cabinet and Carte-de-Visite Lenses are constructed for taking portraits of the popular sizes indicated by their titles; they have a more equal definition over the whole field than the preceeding series, and for this reason are better suited for full-length pictures; they are also extensively used—indeed, is the form best adapted --for enlarging purposes, the smaller sizes being suitable for 'magic lantern' exhibitions, beyond this their use is extremely limited. The whole of the series are of the highest degree of rapidity, the best results are obtained with lenses of long focus, they are of the same rapidity as the preceeding series, viz. $\frac{f}{4}$.

The '*D*' and '*Universal Series*' of lenses may be fairly classed a next of kin to the preceding, holding a position midway between the portrait and view series. They possess a medium flat field, and fair depth of focus, and although an increased exposure is required, they are the most desirable form for groups and studies in the studio, and for the 'promenade,' 'imperial,' and large direct portraits now in fashion. They work at about $\frac{f}{6}$, or U.S. No. 2.

Lenses of the '*Rapid*' class, although strictly of the view series, are the nearest approach to really universal objectives, as in no branch of photography, if skilfully manipulated under suitable conditions, will they fail to render a satisfactory account of themselves. It may, however, be as well, to prevent misconception, to state here that except when in use as a copying lens (for which they are specially desirable) they are decidedly at their best out of doors, and equally at home in rendering ordinary and instantaneous land and seascapes, groups, architecture, and interiors, where a large angle is unnecessary; and last, but not least, are admirably adapted for exhibition lantern objectives, aperture $\frac{f}{8}$, or U.S. No. 4.

SO-CALLED DETECTIVE WORK.

By J. A. C. Branfill.

Having taken a few photographs, during the past season, of the above-mentioned class, perhaps a few remarks about the movements of common objects may be of some use to those who are not quite satisfied with their past results, for how often are instantaneous photographs spoilt by not being taken sufficiently quickly, or by being insufficiently exposed. I prefer to take every object as nearly at rest as possible, and watch for the dead points in the motions of my subjects; for instance, I have succeeded in photographing a navvy at work with a pickaxe, by exposing when the pick was just between the upward and downward motions, had I not caught it then (or after the completion of the stroke) the instrument would have been conspicuous by its absence. In another case I managed

to show the action of a knife-grinder by exposing when the treadle was at its highest point.

Many people seem to think that all parts of a moving body proceed at the same rate, but when you photograph a man walking, some part of his body is generally moving much faster than the mean rate, probably more than twice as fast; for in a carriage the rate of motion of the upper part of a wheel is twice that of the axle, and its motions are much more even than those of a person walking.

I am sometimes told that I should use a quicker shutter, but I always set it at as slow a speed as the nature of my subject will allow when taking common objects in the streets. I am not referring now to sea-scapes, but more of that class of work which I think our worthy editor calls 'slumming.'

HOW IT APPEARS TO A PRINTER.

By James Martin.

The facilities for the interchange of ideas afforded by the pages of The British Journal of Photography are felt to be (like a certain well-advertised pen) 'a boon and a blessing to men,' affording immediate relief when grievances are formulated, but, being necessarily evanescent, as with the appearance of the next number we pass on to the next thing. The Almanac transcends the Journal in this respect, for many who contribute to its pages write only once a year, others are veterans in the art; their communications are the result of large experience, are received with deference, and, what is more to the purpose, are kept always at hand in studio or workroom for reference. It is, therefore, with much pleasure that I respond to an invitation to contribute an article for the Almanac.

My desire is to direct attention to the after-preparation of negatives when the work of development is *assumed* to be complete, and to indicate certain snares and pitfalls, which, if avoided, will tend to make the pursuit of photography satisfactory and ensure friendly relations between the owner of negatives and his printer.

It would avail but little to disguise the fact that I am a photographic printer and enlarger, and in that capacity am in daily receipt of negatives in various conditions of *unfitness* for printing, and it is upon these that I hope to make some remarks which may prove useful to all.

Archdeacon Paley, in his *Natural Theology*, remarks, after a lengthened description of the wonders of the human body, 'It will thus be seen *how many things must go right* to make one day of perfect health.' I think the remark equally applicable to the production of a photographic print; and if the following points were attended to (the negative, of course, being of fair average quality) good prints, quick despatch, and negatives returned with prints might be reasonably required from any photographic printer.

Every negative should bear:—1. The *name* of its owner. 2. Number of prints required. 3. Size of prints, as small ones are sometimes wanted from large negatives. 4. Style of printing, *i.e.*, plain, vignette, or medallion. 5. Whether *un*mounted or mounted, and style, *i.e.*, Un., buff, or G. B. (Un. = unmounted; buff = plain buff; and G. B. = gilt bevel edge.) 6. A consecutive number—for subsequent orders. 7. A title is desirable, but optional, *i.e.*, name of view, or sitter, or group. 8. The spots usually

present should be obliterated. 9. Varnish. 10. Backs should be clean; this should be done *before* drying. 11. All negatives should be perfectly fixed. 12. Date when taken, if desired. Date when sent to printer.

The advantage of this arrangement is that the requirements are always *with* the negative; and should they seem excessive, readers may be encouraged by the statement that the whole may be compressed by judicious abbreviation into a strip four inches long by one-eighth of an inch wide, as the following illustrations will testify:—

SMITH. 12 Cab., plain, G. B., 18.8.88. Mt. Edgcumbe, 144.
BROWN. 6 C.V., Vig., Buff., 23.7.88. Bodmin, 145.
JONES. 25—¼ plate, plain, O. L., 14.9.86. St. Ives, 146.
ROBINSON. 3—12 × 10, Vig., I. T. P. M., 30.6.84. 234.
TAYLOR. 6—10 × 8, plain, Plat., Un., 24.10.88. Lloyd, 476.
MARTIN. 1—23 × 17, Bromide, Mtd., Cut out. Sutton, 540.

Lest the abbreviations should be misunderstood it will be well to say that Cab. = Cabinet. C. V. = *Carte-de-Visite*. G. B. = Gilt bevel-edge mounts. Vig. = Vignette. Buff = Plain buff mounts. O. L. = Oxford line. I. T. P. M. = India tint with plate mark. Plat. = Platinotype. Un. = Unmounted. Bromide Mtd., Cut out = Bromide enlargement roughly mounted and attached to eight-sheet cut-out mount.

Negatives thus completed are ready for immediate printing as soon as they reach the printer's hands, but, as a rule, less than one-third of these conditions are observed, and a proportionate delay in the execution of orders necessarily occurs. The name of the owner on the negative will be readily admitted as important to ensure identification.

Imperfect fixation is a most insidious evil, because so small a trace of bromide may remain in the film as to be unobservable until discolouration takes place while printing, with the result of having one-half the print lighter than the other unless 'printed up.'

The name on the left is that of the owner of negative, that on the right the sitter or locality. The insertion of dates, name of sitter, and consecutive number are, of course, optional, but I think it will be generally recognised that if the negative bears at least what is required from the printer, and is in other respects ready for use, mutual satisfaction will be more fully ensured and business facilitated.

1889.

By WILLIAM LANG, jun., F.C.S.

WE have within these recent years been hearing a good deal about jubilee years, &c. To those interested in photography it may be well to recall the fact that the year we are entering on is the Jubilee year of photography. It is generally conceded that the year of grace which gave birth to the science of photography is 1839. For a considerable period previous to this date the problem of fixing the camera's fleeting images had been present to men's minds. We know that in England the illustrious Sir Humphry Davy and Wedgewood, while Professor Charles in France, made

many attempts early in the present century to secure light pictures, but all met with the same want of success. Another celebrated investigator, Nicephore Nièpce of Chalons, had actually secured pictures of a kind on his metal plates, coated with bitumen of Judæa--and this was accomplished as far back as 1823. It is now a matter of history the famous copartnery entered into by Nièpce and Daguerre, where two men, both imbued with the one idea that what looked then like a dream was a thing capable of accomplishment, and had only to be worked at to bring it to a successful issue. The parnership was effected in 1829, and in 1831 Nièpce passes over to the great majority. The two photographic processes which were given to the world in 1839 were the Daguerreotype, named after its inventor, Daguerre, and Photogenic Drawing, announced by Talbot in a paper to the Royal Society in January of that year. Daguerre's complete divulgence of details did not take place till the month of August. It surely was a bit of inconsistency that a process given free for the benefit of civilised mankind, according to the eloquent Arago, when pleading in the French Chamber of Deputies for a pension to be given to Daguerre, should have been patented in England.

Enough has been said to show how we come to fix on 1839 as the starting point of our science, and now that we have reached the ripe years of a jubilee would it not be well to celebrate the event by a memorial of some sort to our illustrious countryman, Fox Talbot? Strange it is that in France we find monuments erected to Daguerre, to Nièpce, and to Poitevin, while no such tangible record has been accorded to the Englishman who shares with Daguerre the honour of being the discoverer of the science of photography. Let us remove the reproach in this our year of jubilee. It needs but an effort on the part of our photographic brethren to show that we are not unmindful of our famous men. Had we had no Fox Talbot, France alone would have had the credit of the immortal discovery of photography.

PHOTOGRAPHIC SILHOUETTES.

By W. Irving Adams (New York).

Those who remember what cheap portraiture was before the days of the daguerreotype can have no difficulty in recalling the silhouettes or profile portraits cut out in black paper and pasted upon a white card. And it is wonderful what accurate outlines were sometimes thus obtained, especially when the profile of the individual presented well-marked characteristics. I don't know whether it is likely to become a fashion, even if a short-lived one; but of late the application of photography to the silhouette system of portraiture has more than once been made, and some of the results obtained have been such as at least to arrest attention.

Photographic silhouettes may be made with extreme ease. All that is necessary is to have a small, brightly lighted, white background against which to place the sitter in profile. It need scarcely be said that the less light that falls upon the sitter himself the better will be the effect. A quick exposure being given and the development a little forced, we obtain a negative in which the background is opaque and the sitter quite

transparent, which, when printed, yields a black figure on a white ground.

Such silhouettes can be made much better in a private room than in a properly constructed portrait studio, because of the entire reversal of the problem of 'lighting the sitter.' If a light frame, from four to six feet square, be filled with white tissue paper and placed in a well-lighted window, and blinds or shades be so arranged as to prevent all other light from entering the room, all the conditions of lighting are complied with so far as concerns daylight work. In the evening, or after dark, the placing of one or two bright lights behind the translucent background serves a similar purpose. If the white background be opaque, then must it be illuminated by a powerful light from the front, but still so arranged that none of it fall either upon the camera or on that side of the sitter which is nearest the camera, for what is required is to make a strong picture of the background with the sitter interposed in profile as a black shadow. It is obvious that the sitter must be sharply focussed, and that no diaphragm will be required in the lens.

CLEANING AND COPYING DAGUERREOTYPES.

By William England.

As many of the readers of this Annual may have some very valuable daugerreotypes which have become tarnished, and of which they would like to obtain copies, I have thought that a few hints may be of service. It is useless to attempt to make a copy unless the surface is clean, so a few instructions to help those who have not had experience in these matters may be useful.

First remove carefully the plate from the mount and pass a camel-hair brush lightly over the surface, now have ready a solution of pure cyanide of potassium, ten to fifteen grains to the ounce of distilled water, the latter if the daguerreotype is much tarnished. Place this in a small porcelain dish, but before immersing the plate pour over two or three times from a measure some alcohol, now plunge the plate in the cyanide solution, and rock it until all the tarnish has disappeared and the plate looks bright. This may take from three to six or seven minutes. The plate must now be well washed in clean water, and finally with distilled water, and dried in the following manner:—

Hold the corner by a pair of pliers, and with a spirit lamp warm the back of the plate, at the same time blowing with the breath without stopping until the surface is dry. If care has been taken the picture will be as bright as on the day it was taken. Every care must be taken not to touch the surface, except with a camel-hair brush, should dusting be necessary.

Copying a daguerreotype is not a difficult matter if the following directions are carried out:—It must be placed in a good light. If a top light, the plate must be placed sideways so that the vertical light may fall in the direction of what are called the buff marks across the plate. If a side light, then, of course, the plate must be fixed upright. Placed in the sun at a proper angle gives the best of all illumination, if convenient. Having now arranged the picture, place the camera as you would for copying a

carte-de-visite or cabinet, using a rapid rectilinear lens and medium stop, and, to avoid any reflection in front, a piece of cardboard about a foot square covered with velvet, and with an opening just showing the glass of the lens, this will very effectually stop all reflection on the polished surface. In the earlier days of photography collodion was the only method of taking the negative, but now, should I have occasion to copy a daguerreotype, I use the slow landscape gelatine plates or the new rapid chloride of J. Désiré England's ; the latter requires about the same exposure as wet plates, the former about one-sixth. In all cases the slower the plates the better are the results obtained. Very rapid plates should never be used.

One word in conclusion. Great care must be taken in remounting the daguerreotype; it must be bound round with thin gummed paper to prevent the air getting in between the plate and the glass, or it will soon show signs of tarnishing ; if well done it will have secured it a new lease of existence.

OXYETHER LIMELIGHT.

By G. R. Baker.

Do I prefer the ether apparatus to the oxycalcium spirit lamp for the limelight? I say decidedly, yes, and wherever house gas cannot be obtained and a satisfactory and powerful light is required, I should always employ the vapour of ether as a substitute. I have recently used two forms of ether saturators—one made on the Ives' principle, with a U tube, and another designed by a professor of physic with a straight tube. In both instances the light produced was very good indeed, and, after once regulated, little or no attention need be given to it. The general adoption now of compressed gas makes a word of caution necessary on using it, for with a pressure of 120 atmospheres behind the ordinary valve of cylinder the movement of the key, or lever on valve, has to be so delicate that it is seldom the operator can manipulate it with sufficient nicety to just get the proper supply. In several cases I have known of failure to get a satisfactory result because of this, but if only a self-acting regulator (of which there are now three patterns perfectly reliable) is used the pressure can never be more than that to which the spring is set, and which, as a maximum, is generally about twenty-four inches of water. I found the Ives' pattern saturator, when connected with a specially constructed mixed gas jet having a pumice chamber immediately below the nozzle, give a light as nearly as possible equal to that of any oxyhydrogen mixed gas jet of first-class construction. The jets were placed in a biunial lantern, and by means of a T piece the same gas cylinder supplied both jets with oxygen, so the optical and other conditions were similar. From experience now with the serpent form of (divided partitions) copper tank, as recommended and extensively used by the Rev. F. Hardwick, the Ives' double tube with U connexion, and the single barrel special form just designed, I unhesitatingly say, with care and attention to detail, no difficulty should be experienced in working them either as a single limelight or for dissolving. The difficulty I experienced with the particular pattern of the Ives' U form saturator I used was the making of the joints sound—the application of soap after screwing up being a messy affair. This, however, was quite overcome in

the single tube arrangement, and, no doubt, with some slight modifications, can be in the other. In one instance a roll of flannel or lint was used to fill the tube, and in the other waste sponge. I incline to the latter as the best, for the retardation of pressure is more regular through the folds than past the broken-up sponge. At any rate, the result was a more steady light with the former than the latter, while I think all exhibitors will agree with me that where they can get both compressed hydrogen (or house gas) and oxygen they would not look elsewhere for a limelight; but in country places, in the Colonies, and remote parts, the oxygen can always be made, and the methylated sulphuric ether, which is obtainable almost everywhere, is no doubt the very best substitute for hydrogen. It gives far more illuminating power than the methylated spirits of wine, gives no trouble in management of wicks, and is much cooler and cleaner to work than the oxycalcium or any of the paraffin lamps with two, three, or four wicks.

AN IMPROVED SILVER INTENSIFIER FOR GELATINE PLATES, ETC.

By J. B. B. Wellington.

Who has not had, at some time or other, a negative, or, may be, several negatives, that have been so miserably thin that all efforts to produce a print at all passable have been utterly useless, and if the negative is valued at all, one is inclined to think twice before trusting it to the uncertain vagaries of mercury. As this is not the place for a long paper on intensification generally, suffice it to say that it has always been looked upon that silver intensification in some shape or other was the only certain method to ensure a permanent result.

Silver intensification as used for wet plates, namely, with nitrate of silver and pyro, is out of the question for the ordinary work of the photographer of the present day, as the hypo has to be thoroughly eliminated from the gelatine film by long continued washing, and even after this has been done the nitrate of silver has often a persistent habit of staining the film red, and which even occurs in collodion plates.

A more feasible plan of silver intensification for gelatine plates was published by Mr. Howard Farmer last year, in which he dissolved bromide of silver in hypo, using it in conjunction with pyro and ammonia, and was, I considered, a step in the right direction. The one drawback to this I found, that after a very few minutes the solution became too muddy, through the silver being thrown out of solution and was thus wasted.

As I felt that it was in this direction lay the germ of future intensifiers, I carried out a few experiments, with the result that I can now carry on intensification without the silver being thrown out of solution, producing a negative of any intensity from the merest ghost of an image, and resembling in character any ordinary developed negative.

Silver nitrate	100 grains.
Water	2 ounces.

Add to this 240 grains of sulphocyanide of ammonium; a precipitate is formed which is again redissolved. On diluting this to ten ounces with water another precipitate is thrown out. Now dissolve this precipitate

by adding hyposulphite of soda to the solution. This constitutes the stock solution.

To intensify take—

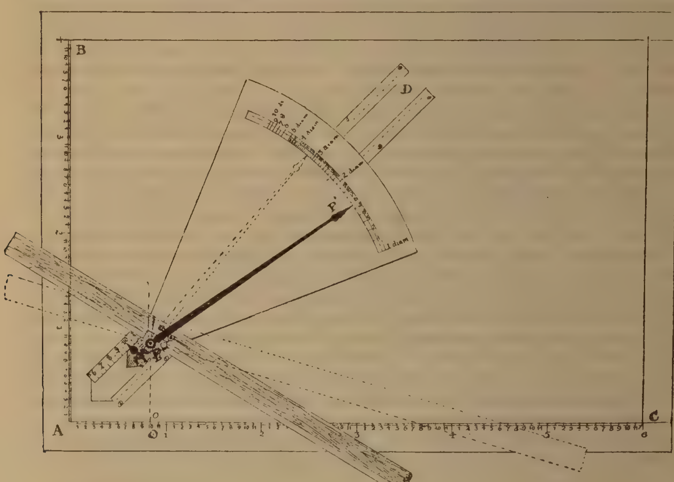
Stock solution	1 ounce.
From usual stock solutions—	
Pyro	3 grains.
Sulphite of soda	12 ,,
Ammonia	6 minims.
Bromide	2 grains.

From five to ten minutes will produce a dense negative from a very thin one without staining in the slightest degree. More ammonia may be added from time to time if not sufficiently energetic. For wet plates, collodio-bromide and gelatine, it cannot be surpassed at present.

A MECHANICAL METHOD OF OBTAINING THE POSITION OF THE CONJUGATE FOCI IN ENLARGEMENTS OR REDUCTIONS.

By Lyonel Clark, C.E.

During the present year it fell to my lot to have the planning of an enlarging camera for the use of the members of the Camera Club. This naturally meant an apparatus where lenses of every length of focus would be used. To facilitate operations I had intended to append a table giving



the different positions of the two conjugate foci for lenses of any focus and for any number of times of enlargement or reduction. But I found that such a table, to be anything like complete, would be extremely voluminous. I then came across Sir Howard Grubb's description of a focimeter in last year's Almanac, pp. 286–7, and starting from this I

constructed the focimeter of which the present cut is an illustration. The theory and description of this apparatus appeared in a communication to the Camera Club *Journal*, vol. ii., pp. 142-3, and also in The British Journal of Photography, No. 1483, p. 632.

No illustration of the apparatus, however, was given, and as the method has found some favour amongst the *cognoscenti*, I have thought that a working drawing might be useful, and that no fitter place for its appearance could be found than in the pages of that Almanac where Sir Howard Grubb's first germ of the idea appeared.

The illustration in question represents the apparatus designed for the use of the Camera Club, but is equally applicable to any establishment where enlarging on a large and varied scale is carried on.

This apparatus is constructed for lenses of any focal length, but for amateurs who only use a lens of one focal length it can be made in a more simple form.

To construct the simpler form of apparatus you lay off a right angle, B A C, and divide its two sides, A B, A C, into feet and inches; the length of A B, which represents the major conjugate, is of course determined by the extension of the enlarging camera or easel. Not to have too bulky an apparatus, the sides will best be divided to some scale, say one-quarter or one-eighth.

You next divide the right angle into two equal parts by the diagonal A D; to obtain the correct position of the pin P, on which the straightedge rocks, you have to erect a perpendicular on either side at the division on the scale coresponding to the focal length of the lens to be used.

In the cut the slide is set for a 10″ lens, and therefore the perpendicular, O P, is erected at the 10″ mark on A C, and the spot, P, where O P cuts the diagonal, A D, is where the pin has to be placed. Against this pin any ordinary straightedge is rocked. It is, of course, best to let a small piece of brass into the straightedge, through which the pin is inserted; this prevents shifting. The straightedge is furnished with an index, or pointer, P P′. This is best placed, for the sake of symmetry, not at right angles to the scale, but $22\frac{1}{2}°$ less.

This completes the whole apparatus. The scale of diameters of enlargements is marked off from actual practice and requires no calculation. I will point out later on the best practical way of graduating this quadrant.

For a large establishment, where lenses of different foci are used, the straightedge, with its pivot, pointer, and quadrant, are carried on a moving piece and can slide up and down the diagonal A D, which is now divided off in a continuous scale of foci. These, of course, are obtained in the same manner as the single focus was obtained.

Now for the practical way of graduating the quadrant of diameters of enlargement. This scale is best expressed decimally, as in working out the size of enlargement one figure is divided by another and the result naturally works out as a decimal.

The manner of graduation is done by calculating out a series of diameters of enlargements for one known lens. We need only deal with one conjugate, preferably the major, A C. The equation for this length is $(n+1)\ f$, where n = number of times of enlargement, and f the focal length of the lens. Now we can take the focal length of our lens as anything, we will make it unity in inches, and the equation becomes $n+1$; that is, the length of the major conjugate is the number of diameters of enlargement plus one (expressed in inches). To enlarge one diameter—that is,

to obtain an image of equal size—it is $1+1$, that is, 2; for 2 diam. 3; for 3 diam. 4; and so on. As one inch is so small a thing to deal with, it is best to take 10″ as the focus of the lens. This only alters the decimal point; 2 diam. is still 30 inches, and has the advantage that each added inch represents a tenth of a diameter. So practically, setting our index (the *fleur de lys*) at 10″, we swing the straightedge until it cuts the 20″ mark on A C, and there mark the spot at which the pointer, P P′, stands as 1 diam.; moving the straightedge to 21″ we mark off from the pointer 1·1 diam., at 22″=1·2 diam., at 23″=1·3 diam., and so on for each succeeding inch.

The scale of diameters of enlargement thus laid out is true for whatever lens we like to adjust our slide to. Whatever focus we are using, if we set the *fleur de lys* to it, and then swing our pointer, P P′, to the number of diameters we wish to enlarge, we shall read off where the straightedge cuts, A B and A C, the length of the two conjugates.

In the cut the *fleur de lys* is set for a 10″ lens, and the pointer indicates 1·65 diameters. We read off on the major conjugate, A B, that is, the distance from the lens centre to the enlargement, 2′·2½″, and on the minor, that is, the distance from the lens to the negative, 1′·4⅛″.

Let us check this by calculation.

$$
\begin{aligned}
\text{The major conjugate} &= (n+1)f \\
&= (1{\cdot}65+1)\,10'' \\
&= 26''{\cdot}5 \\
&= 2'{\cdot}2\tfrac{1}{2}'' \\
\text{minor conjugate} &= \frac{\text{major conjugate}}{n} \\
&= \frac{26{\cdot}5}{1{\cdot}65} \text{ in inches.} \\
&= 16''{\cdot}1 \\
&= 1'{\cdot}4''\tfrac{1}{8}.
\end{aligned}
$$

The accuracy of result must, of course, depend on the care in the manufacture of the instrument.

It is, perhaps, hardly necessary to point out that in the case of reduction the figures remain the same, but the major axis is now the distance of the negative from the lens, and the minor axis the distance of the lens from the reduction.

EXPOSURE.

By Sir David Salomons.

No good print can be made from a bad negative. Amateurs constantly complain of their plates, find their paper will not tone, and meet with other difficulties, most of which, upon investigation, would be found to originate with faulty negatives.

To make a good negative three things are necessary:—

1. Good lighting of the subject.
2. A correct exposure.
3. Development carried to the proper degree.

Let us consider No. 1 first. Many photographers fail to understand why some particular artist's productions are always so good, and so

superior to their own, especially when they find their own negatives perfect by the usual standards. The reason for this superiority is generally to be found in the lighting of the object. This question seems simple to all except those who have made a study of the subject. In fact, the treatment of the object is one which requires much attention and study.. A few persons have the 'sense' of proper lighting born in them, but the majority must work for the knowledge, whilst some seem unable to appreciate differences produced by variations of light and shade, however much they try. In all cases the same object, well or badly lighted—all other things being equal—produces negatives so different that, judging by results, no one would believe that the lighting was the only difference made.

No. 2.—This is the chief difficulty with amateurs, and a plan is suggested which, although requiring modifications in practice, is not bad for general work. It is supposed that the stops are marked on the decimal system, for this method is very easy for calculation. If required to convert the decimal to the uniform (or Photographic Society's) standard, multiply the number by ten and divide by sixteen. The decimal system has the advantage that whole numbers are always employed in the method of calculating the exposure to be proposed.

In order to mark the stops correctly, the focal length of the lens must be known. The following is a very simple way of determining the focal length sufficiently near for all practical purposes:—Purchase a number of single lenses, commencing with one having three inches for its focal length. Those following should have focal lengths advancing by a quarter of an inch up to six inches, then by half inches to ten, and after this by inches to twenty. This gives a series of thirty-one lenses of, say, one inch diameter, which may be purchased at from one penny to twopence each at any optician's.

This five shillingsworth of glasses gives the means of determining the focal lengths of all lenses, covering from quarter-plate to 12×10. To test a photographic lens consisting of more than one combination, hold one of the single lenses level with or touching the diaphragm slots, and throw the image of the lens under observation of some object on a sheet of paper. At night a candle or lamp flame answers well. By changing the single lenses till two images are shown, one by the photographic lens and one by the single lens, both in focus and equal in size, the required result is obtained, and whatever is the focal length scratched on the test lens is also the approximate focal length of the photographic lens. When single combinations are to be tested, the single glasses must be held in a plane with the lens in the mount. By this manner, in less than a minute, three or four lenses may have their focal lengths determined close enough to mark the stops.

The focal length of a lens being determined, measure the diameters of the stops in sixteenths of an inch. Now divide the focal length by the diameter of each stop, square, and put a decimal point (equivalent to dividing by ten) to each result. The number thus found for each stop should be stamped upon it, and may, in future, be regarded as the multiplier.

To find a starting point let us imagine that we expose with a standard lens—that is, one which would have 'one' stamped on the stop. We may accept that one to five seconds' exposure is sufficient with a

standard lens indoors for almost every subject which is usually taken with general lighting. For outdoors take one-tenth to five-tenths of a second. If the light indoors is good and the subject not exceptionally dark, for the months of May, June, July, August, and September, one second is sufficient; as the winter comes on, the time should be doubled or trebled, and in December quadrupled. Hence, all that it is necessary, is to determine whether one or two seconds should be given (for indoors this is the most common case) and then multiply by the number on the stop employed. Very rarely will a failure result if this plan is followed. Many other circumstances require to be taken into account on special occasions, but these need not be entered upon here.

Experienced photographers, and those who always take very similar subjects, can judge the exposure by the appearance of the picture upon the screen; but the method is crude and often leads to false results, only to be corrected by careful development.

The imaginary one to five seconds' exposure holds good only with very rapid plates; with slow ones the time must be doubled or more, to be determined by a trial.

Having settled the questions of lighting and exposure, development becomes easy enough. In the first place the developer may remain on till it is exhausted, for there is little fear of over development, and none on the other side. In fact, as soon as the lights appear perfectly opaque by transmitted light, and the image just shows at the back of the plate, the work is done. The image comes through very soon with cheap plates, so density is the chief point to attain. Hence, if No. 1 and No. 2 have been properly carried out, No. 3 becomes a purely mechanical process, devoid of all those delicacies insisted on in text-books, and which are necessary when lighting and exposure are not correctly arranged.

'The proof of the pudding is in the eating,' and the writer only settled this method of exposure after laborious experiment, and then put it in practice on photographic beginners, which ended in their obtaining properly exposed negatives in all cases. For one instance, a series of plates on various indoor and outdoor subjects were exposed by a gentleman who had only one lesson or lecture of two hours, never having touched a camera before, and all the plates were correctly exposed (he did not develop them). There is consequently much in the foregoing proposals to commend themselves to amateurs and others who find difficulty in the exposure direction as well as in the subsequent operations.

ACTION OF SOLUBLE BROMIDES ON THE LATENT IMAGE.

By Dr. Hill Norris.

When I sat down to comply with your kind invitation to contribute 'a bit' for the Almanac, I commenced to write on chemical development generally, but the seeming little rivulet swelled out into so broad a stream, and wore such a threatening, ominous aspect, as to induce me to seek shelter in one of its tributaries, hence the restricted title of my present article.

A general impression prevails that the soluble bromides possess the power of destroying the photographic image; it is fostered by statements which appear in photographic works of repute, thus one reads: 'There can

be no doubt that flooding the plate with the bromide solution is wrong in principle, since bromide has a tendency to destroy the photographic image.' Many persons believe that this is the method of their operation when exerting their well-known power of counteracting the effects of over exposure. It is important, not only from a theoretical, but also from a practical point of view, that this question should be definitely decided, for on its solution depends whether we may use the bromides boldly as simple chemical restrainers from undue reduction in development, or timidly as now, with fear and trembling lest our delicate and cherished details should be obliterated. The question presents itself in a twofold aspect. 1. What is the action *per se* of soluble bromide on an exposed film? 2. What is its action when associated with pyro or with pyro and alkali? I have endeavoured to furnish experimental answers to these queries by means of a sensitometer which can be used in a copying camera and illuminated with a definite and known amount of light. To secure the sensitiveness being the same in all cases the plates required are obtained by cutting up a larger plate; such conditions as these are a *sine quâ non* in all such experiments. The sensitometer I have used consists of superimposed layers of gelatine tissue of equal thickness, ranging from one to sixteen layers. The negatives sent herewith illustrate the nature of this instrument and also the facts it is capable of revealing. The outer circle, the segments of which are marked with crosses, represents the gelatine; the middle circle carries the figures which indicate the number of layers in the segment opposite to it; the middle and the central circle are clear glass except where the figures are. These transparent parts are useful as giving an idea of the degree of intensity yielded in each case by the exposure given. In the examples before us the exposure given in each case was precisely six seconds; the same developer was used and the development pushed to the utmost. Plate 1 shows the normal, *i.e.*, what can be obtained with regularity on these films with six seconds' exposure and a given developer. When the negative (plate 1) is placed face downwards on a piece of white paper it will be seen that the crosses cannot be traced beyond number twelve, which means that twelve equal thicknesses of gelatine superimposed can screen the film from an exposure of six seconds duration, or rather, as will be seen in the sequel, admits only of an exposure which under these conditions is undevelopable. Plate 2 represents a film which after six seconds' exposure was *before development* soaked in a solution of potassium bromide of the strength of ten grains to the ounce and afterwards soaked and washed in distilled water for fifteen minutes. An exposure is here obtained through sixteen layers which has developed as intensely as in Nos. 9 or 10 of the preceding case. In experiments of this class we obtain evidence that so far from the bromide of potassium having destroyed any part of the latent image, it has actually rendered it possible for the developer to bring out more of the feebler effects of light. The importance of this will be recognised when it is remembered that in an ordinary picture or portrait this means more details in the deepest shadows. Now this plate was not slower than usual in its development; it will be seen, too, that this experiment strikes a blow at another theory, which has been expressed as follows:—'The bromide of potassium or other soluble bromide slows the development probably through the formation of a double salt of bromide of silver and potassium, which being

x 2

reduced with difficulty retards reduction, and hence a greater apparent density of deposit is given through the slow development. Now, a film that has been soaked for eleven minutes in a ten-grain solution of bromide has had every opportunity of becoming a double salt, and yet it did not develop more slowly.'

If such a view is correct, a plate should not only develop more slowly *in the presence of soluble bromide*, but also after having remained in it for a considerable time and subsequently being washed, because such an influence would be a permanent one not likely to be revoked by simple washing.

Facts like these seem to indicate that we must look in another direction for the explanation of the peculiar action of bromides in development. We must, in the first place, rid ourselves of the idea that it is due to an action on the exposed film *per se*, and seek for it in the relations which the several substances constituting a developer hold to each other. The action is mainly, but not altogether, one which bromide exerts when present and not after it has been thoroughly removed. Every old collodion worker knew how essential it was that his developer should possess stability, *i e.*, should not readily decompose apart from the influence of the exposed film. To my mind the same principle holds good in chemical development and is the secret of the action of the bromides, in fact of all restrainers. The presence of the exposed film itself as a factor in development is too much neglected. Let us suppose, for example, we have constructed a well-restrained developer, *i.e.*, one that is free from a tendency to spontaneous decomposition, and which, left to itself, will not become coloured for a considerable time. Into this we introduce an exposed film which gradually commences to develop; the determination of developmental action is obviously due to the exposed film, which starts a series of chemical changes; the deoxidising agencies and the oxides destined to be decomposed were already present together in the developer in a state of balanced or restrained stability, the exposed film (or silver sub-bromide) introduced was the one thing wanting to upset this equilibrium, because it was prepared to yield up bromine to the alkaline bases—sodium, potassium, ammonium, as the case might be, and the oxides of these metals would yield up oxygen to the alkaline pyro providing their basic affinities could be otherwise satisfied, hence the series of reactions which result in silver being liberated as the photographic image. In brief, the decomposition is as much due to the exposed film as to the developer, and as this film will be active in proportion to its exposure or to the amount of sub-bromide formed by the action of light, it follows that for a normal *rate* of silver deposition to be maintained which will yield a sufficiently intense image the developer must be regulated to the exposure of the film, *i.e.*, the power of the alkaline pyro to abstract oxygen from the soda, potash, or ammonia must be more and more restrained by the introduction of bromides and sulphites and by diminishing the alkali. It is the alkali which is dismembered under the combined influence of the alkaline pyro and the exposed film (silver sub-bromide), and this dismemberment involves the precipitation of pure silver (photographic image). The law of development seems, therefore, to be: Restrain the activity of the alkaline pyro in the ratio of the activity or degree of exposure of the film. For short exposures use the least possible amount of restrainer consistent with the prevention of

spontaneous decomposition of the developer, reduce the alkali, and give plenty of time. For over exposures use an amount of restrainer which will tame down the activity of the developer to *its usual rate with a properly exposed film.* It is well to bear in mind that it is the *rate* of development which determines the character of the resultant negative—slowness giving strength, rapidity weakness.

FUMED SENSITIVE PAPER.

By Colonel Stuart-Wortley.

I have been struck lately, in looking over a number of old photographs printed by me many years ago, by the excellent way in which all those printed on paper fumed with ammonia have kept. I think there has been a certain amount of prejudice against fuming, and yet the brilliancy and clearness of all these old prints speaks much in its favour. And it is of great value to be able to make a sensitive paper that will keep for a considerable time after sensitising, and that can be at once brought into a state of perfection for printing from by a very simple process.

There is one advantage that I may mention in this process, *i.e.*, that the taking off of the spare silver when the paper leaves the silver bath gives a clearness to the deeper shadows of the finished prints that is of great value from an artistic point of view.

Having to reply to the editor's kindly request for something for the Almanac, I have thought it well to call attention to a process that many of those who are newly taking up photography may find it worth their while to look into.

COLOUR PHOTOGRAPHY.

By A. G. Field.

The excitement caused by any rumour of the discovery of colour photography is proof of the welcome which it would receive. But why welcome it? One can understand the desire for it by lovers of the chromo style of art, and its usefulness in scientific research. But why those can long for its advent who accept the dictum that 'art is suggestion as opposed to imitation' passes all understanding. Again, those colourists who resent the mere rumour of its introduction as an innovation dangerous to their work clearly are wrong. Their superiority will lie in their power of improving nature's combinations of colour, which a colour photograph will exactly represent, and which are in so many cases painful, even repulsive, when transferred to paper. The colour photograph will fix the facsimile aspect for ever, while the painter will catch the idea of change—the spirit of constant alteration in his subject.

Why photographers desire it also puzzles me. The glory of photography is its suggestion of life and colour by a colourless gradation. The supplying of the absent quantity by the educated mind affords more pleasure and develops more intelligence than its representation by mechanical means. It was the 'facsimile' style that stamped a photograph in days past 'a mere photograph' (as in the phrase 'painfully, photographically correct'). If this infatuation becomes general we shall

be retrogressing, while other and older branches of art are seeking that spirit which so impressed 'Archie McNab':—'Some o' thae pictur's need tae be looked et for a guid while afore ye can mak' oot what they are. An', strange tae say, these are the vera pictur's which bring ye back tae them again an' yet again. They hae a fascination, that's what they hae.'

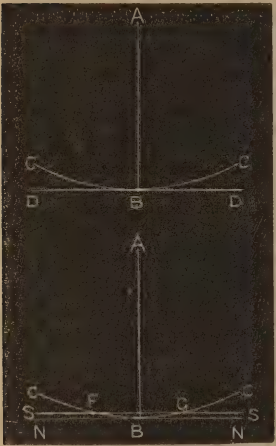
The attainment of colour photography is certain. It will be effected either by the retention of the fleeting sheens of the daguerreotype, or by a startling application of that marvel of modern science, aniline. When the discovery is perfected there will be one consolation—at last we shall have at our disposal a means of educating the Central Africans.

FOCUSSING AND STOPPING DOWN.

By J. R. Gotz.

When viewing an image on the ground glass the question arises, What part—figure or object—should be sharply focussed? Apart from the general principle that the main object of the picture should be the one to which attention must be directed, there may be different ways of placing or viewing that object, provided such an object can be singled out, which is not always the case.

There is an idea prevalent that the focus on a double combination lens being stopped down is *lengthened out*, and that this should be allowed for when operating under the focussing cloth. But I think it can be shown that this arises from an inaccurate appreciation of what takes place *when the lens is stopped* down.



It may be taken as a general practice that focus is taken with the full, or a fairly large aperture, and that when the composition of the image seems satisfactory the lens is stopped down to what circumstances of light, subject, and, perhaps, time seem to demand. Now, it will greatly depend on how the principal object on which focus is taken is situated with regard to the other parts of the picture, and from its position the general focus may be materially affected in the resulting picture. If the principal object appear on or about the middle of the plate, and placed about middle distance, no difficulty need arise, for if focussed sharply, with a fairly large aperture, it will still be in sharp focus after the lens has been stopped down. But when a view contains a number of objects which all demand to be in focus, and two such objects, situated, say, each on the centre of the two halves of the plate, it happens that the whole picture may be thrown out of focus. The reason is easily traced from the accompanying diagram.

When the lens is stopped down the image, which, with the full aperture, was brought to focus on a curve, or properly on a sphere, is flattened out, and comes approximately to focus on a plane—the plane of the focussing screen. The line A B represents the axis of the rays and focal length, D B D the plane of the focussing screen, C B C the curve of the image. When the lens is stopped down, the points C and D on both sides of the centre coalesce *on the plane of the focussing screen*, and everything is in focus.

Now take the case when the two objects at different points from the centre are focussed.

A B, focal axis; S B S, plate; F and G, points at which focus was taken; C′ B′ C′, curve of image in focus with full aperture; N B′ N, plane of image in focus after stopping down the lens.

It will be remarked that this plane is now *behind* the one of the focussing screen. The picture, under these conditions, must be out of focus, and objects that are at the greater distance must be in better focus than the nearer or principal objects focussed for. Hence the belief that the focus of lenses is lengthened through stopping down!

Though the increased power of the lens, when stopped down, to bring all objects up to a certain distance into approximate focus may mitigate the fault, there is no doubt that many pictures are spoilt by the above-described incorrect way of focussing.

Little difficulty will be experienced when the chief parts of a picture lie in a sort of semi-circle, the foreground being nicely distributed on both sides and the background coming fairly in the centre of the plate; but when parts of the foreground are right in the middle of the view, or the subject-matter be rather one-sided, special attention to the above points may be of value in producing a pleasing picture.

Stopping down is practised by some to a curious extent, as if sharpness all over were the first condition of an artistic picture, but, except with wide-angle lenses, is easily carried too far.

The centre of the picture, which, when viewed through a fairly large aperture, appears brilliantly lit up, forming a beautiful contrast to the deeper shadows of the nearer objects and foreground, is, through stopping down, dimmed to nearly the same tone as the foreground, and a flat picture, full of detail perhaps, but unsatisfactory with regard to contrasts, is the result.

This is easily accounted for from the fact that, with a large aperture, the rays coming from the distance and falling in broad pencils of light on the wide surface of the lens bring the whole mass of light to bear upon the formation of the image. When stopping down is resorted to, extreme definition may be gained, but the broad pencils of light that reach the front lens are cut down by the diaphragm, and those that reach the sensitive surface, though able to give extreme definition on a plane because passing all through the optical centre of the lens, have lost their quantitative light power, and have become nearly equal to the oblique rays which, under the circumstances, also pass through the optical centre, the only difference being that the former have not quite so far to travel as these.

Thus, both choosing a subject for focussing and applying the proper diaphragm require both discretion and judgment in order to contribute to pleasing results.

The following were received too late for classification amongst the 'Photographic Societies, &c.':—

Albany Institute Amateur Photographic Society.—(ESTABLISHED 1888.)—Meetings, January 1, and every other Tuesday throughout the year, in the Institute, 345 Albany Road, Walworth, S.E. *President*—G. S. Martin. *Committee*—G. H. A. Bucknole, H. Harvey, W. Liberty, J. S. Simon. *Curator*—W. Rhodes. *Librarian*—W. A. Cordrey. *Hon. Secretary and Treasurer*—Alfred B. Gee, 19 Drakefell Road, Nunhead, S.E.

Darlington Photographic Society.—(ESTABLISHED 1888.)—Meetings held on the second Monday in the month. Annual Meeting in November. *President*—G. Newby Watson. *Vice-President*—J. A. Fothergill, M.R.C.S. *Council*—R. A. Luck, W. F. K. Stock, J. I'Anson, T. Howlett. *Treasurer*—E. Ensor, M.A. *Hon. Secretary*—W. Garritte Brewis, Blytheville, Darlington.

London Social Camera Club.—(ESTABLISHED 1887.)—Meetings are held on the first Wednesday in the month; also Outdoor Meetings as arranged. The Club, being an offshoot of the London Social Cycling Club, was formed with the object of encouraging photography amongst cyclists more especially, but is not confined to riders. *Hon. Secretary*—Herbert Smith, 6 New Broad Street, E.C.

People's Palace Photographic Club.—(ESTABLISHED 1888.)—Ordinary Meetings are held on the first and third Fridays in the month, at Eight p.m. Outdoor Excursions every other Saturday during the summer months. Annual meeting in September. *President*—Sir Edmund Hay Currie.—*Vice-Presidents*—E. Howard Farmer, F.C.S., F.I.C., C. W. Hastings, Robert Mitchell. *Committee*—Messrs. Albu, R. Beckett, Downing, Gamble, Hawkins, Lawday, Marriott. *Librarian*—W. Ludlow, 68 Jamaica Street, Stepney, E. *Hon. Secretary and Treasurer*—William Barrett, 16 Clare Road, Forest Gate, E.

Sheffield Camera Club.—(ESTABLISHED 1888.)—Meetings are held on the first Friday in each month. Annual Meeting on the first Friday in January. *President*—T. H. Morton, M.D. *Vice-Presidents*—B. W. Winder, F.C.S., G. E. Maleham. *Committee*—C. F. Coombe, M.R.C.S., H. J. Hardy, F.C.S., E. Howarth, F.R.A.S., G. T. W. Newsholme, M.P.S., J. H. Rawson, C. Yeomans. *Treasurer*—W. Gilley. *Hon. Secretary*—J. O. Arnold, F.C.S., 34 Bank Street, Sheffield.

Southport Photographic Society.—(ESTABLISHED 1888.)—Meetings held on the fourth Mondays in each month at the Y. M. C. A. Rooms, Eastbank Street. Annual Meeting in March. *President*—Benjamin Wyles. *Vice-Presidents*—E. S. Harper and Dr. Monk. *Council*—B. Boothroyd, H. E. Peach, J. S. Dickin, J. B. Walker, D. G. Wilkinson. *Treasurer*—H. J. Heaton. *Secretary*—W. Marsden, 35A Arbour Street, Southport. *Assistant Secretary*—A. Bedford.

Southsea Amateur Photographic Society.—(ESTABLISHED 1888.)—Ordinary Meetings held at the Society's Rooms, 3 King's Road, first Wednesday in every month, and Informal Meetings on the third Wednesday in every month, at Nine p.m. Monthly Excursions during the summer. *President*—L. G. Bonham-Carter. *Vice-President*—Lieut. C. E. Gladstone, R.N. *Council*—Dr. Barrington, R.N., Lieut. Cobb, R.N., A. Fisher, Capt. T. Lamb, C. N. Newby, F.R.C.S., S. W. Winter. *Hon. Treasurer*—J. J. Thornton. *Hon. Secretary*—F. Lord, L.R.C.P., Wilton House, Landport Terrace, Southsea.

Worcestershire Camera Club.—(Established 1888.)—Ordinary meetings are held at the School of Science, Kidderminster, on the second Tuesday in each month. Rambles on alternate Saturday afternoons during the summer. *President* — Michael Tomkinson. *Vice-Presidents* — Albert Cowell and Arthur Comber. *Council*—C. N. Bass, C. J. Carter, B. Hepworth, J. S. Hussey, Horatio Smith, C. Walker, Arthur Whittall. *Treasurer*—Harvey Preen. *Secretary*—William Ray, School of Science, Kidderminster.

York Photographic Society.—(Established 1888.)—Meetings held on the first Tuesday in each month at 19 High Ousegate, York, at half-past Seven p.m. *President*—Mr. Vincent. *Council*—Messrs. Haynes, Hick, Maccormac, Ogden, Penrose, Tittenson. *Treasurer*—Mr. Bainbridge. *Secretary*—F. C. Benson, 18 Russell Street, York.

USEFUL RECEIPTS.

Halation.—A quick drying coating, which is applied to the back of the plate, consists of collodion, with which any dark red or brown pigment is mixed. Spanish brown or rouge answers well.

To Remove a Collodion Film from Glass.—Place the plate in a vessel of water very strongly acidulated with sulphuric or other acid which has no action on the silver image, and the film will speedily become loosened and float off.

Reducing the Intensity of Negatives.—To reduce a negative on either paper or glass, place it in a weak solution of ferricyanide of potassium and hyposulphite of soda—say three grains of the former to an ounce of a five per cent. solution of hypo, the solution being freshly prepared.

To Recover Silver Bromide from Waste Emulsion.—Let the emulsion be melted, and then add a small quantity of hydrochloric acid, following by boiling for two or three minutes. The silver bromide precipitates, and the destroyed gelatine is then poured off. The bromide is then placed among the other residues for reduction.

Dead Black Varnish.—Take two grains of lampblack, put it into any smooth, shallow dish, such as a saucer or small butter-plate, add a little gold size, and thoroughly mix the two together. Just enough gold size should be used as will hold the lampblack together: about three drops, of such size as may be had by dipping the point of a lead-pencil about half an inch into the gold size, will be found right for the above quantity of lampblack; it should be added a drop at a time, however. After the lampblack and size are thoroughly mixed and worked, add twenty-four drops of turpentine, and again mix and work. It is then ready for use. Apply it thin with a camel-hair brush, and when it is dry the articles will have as fine a dead black as when they came from the optician's hands.

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EPITOME OF PROGRESS DURING 1888.

COMPOSING PICTURES.

MR. DAVID R. CLARK gives the following rules to be observed in the composition of a picture:—Never place the principal object of size or interest exactly in the middle of the picture either vertically or horizontally. A central position divides the surface into equal parts and produces uniformity rather than variety.

The photographer must make every effort to convey the idea of atmosphere in his picture, and endeavour to realise the idea of the separation of the various objects in a picture. To convey this idea none of the principal objects or leading features of his picture should be perpendicularly over or horizontally level with each other, because if they be so placed they either repeat actually or by suggestion the horizontal and perpendicular lines which artificially limit his picture, and which require to be concealed as much as possible from observation.

In Harding's illustrations of this law you will find how true this is, and every one must know by experience how the alteration of the position of the camera nearer to a tree or other object raises its height, and thus lifts it from the horizontal line that it would otherwise form with other trees or objects. Frequently it happens that long, straight lines are so connected with the subject that they cannot be suppressed. In this case the best way to get over the difficulty is, if possible, to introduce contrasting lines to break the monotony. A piece or two of timber placed against a wall, or a tree branch may be used; or the foreground may have sufficient interest in it to lead the eye away from the monotony of the straight wall. Figures, of course, are what is wanted, and if you can get some one to stand in the proper position you can in that way overcome the difficulty. The great point, however, is to make the figures natural in pose, not to appear as if being 'took.' In landscape it should be always remembered that figures should not be the centre of attraction in themselves apart from their connexion with the picture, and the moment they overstep this they become very objectionable.

When we have selected our position for a picture there may be an uninteresting foreground, and we should, if possible, avoid that, unless it is for the purpose of introducing a contrast of repose to motion or life in other parts of the picture. Thus, a strip of smooth sand with a quiet pool reflecting the sky comes in as a splendid contrast to a rough, tumbling sea dashing on to a shore; or a long stretch of moorland, which is too quiet and tame in the middle distance, may be finely relieved by clumps of bracken or heather, or by a few rocks in the foreground.

Again, suppose you have a mountain scene with a loch, but there is no decided foreground at the spot you are standing on, look around and, perhaps, a few yards off you may see a few rocks from which your photograph may be taken, and which in themselves present the desired contrast. Common sense will suggest at once that the scene should be taken from the rocks, and the rocks themselves should be introduced at that point where they will appear to the best advantage; but they should not be made to repeat again the form of the mountain or the circle of a lake, but contrast with them.

The third rule, and it is probably the most important of all, is this: There should be in all compositions one chief point of interest. If it be large, there is no limit to the lesser points of interest in the picture, provided you keep them subsidiary, and do not let them detract from the one chief point of

interest you have in view. 'To choose a subject well, you should always think how it will compose in your picture,' either with or without the accessories of figures or other effects. Fix upon the subject you wish to photograph, and let all the accessories contribute to form the picture; do not let them detract from its interest by leading the eye to centre on them instead of the picture itself as a whole. Where figures or accessories are introduced they should be placed not where the landscape interest is in itself strong, but where it is comparatively weak. For example, an open expanse of field is always a trying space to represent agreeably. There a group of sheep or cattle at a distance may come in naturally, and form a pleasant contrast.

A bridge presenting a long, straight line on the top is relieved by a figure or two looking over the parapet, and they tend to keep the eye occupied with an interesting detail in a portion of a picture which would be uninteresting, and the straight line in which by itself when so prolonged would be an inartistic feature.

A fourth rule of composition is: That the two sides of a picture should balance each other nearly always in either interest or mass, or both combined. But the best form is the last named, where the smallest mass has the greatest interest; but the reverse equally holds good. Where you have on the right, say, a cart returning from a hayfield, with figures in the foreground, a nicely arranged lighter and distant background on the left, although in itself too distant to form a complete picture, may have sufficient interest to heighten the effect of the prominent mass in the foreground.

Further, to form a good picture, not only the masses combined with the interest must balance, but the light should be concentrated on one point and the shadow on another. It is a necessity to have some leading mass of light towards which the eye is directed; also, on the other hand, the same principle applies where there is a leading mass of dark on which the eye may rest without being disturbed by any other equally effective portion of the picture; and upon the size and position of these relatively will depend the general effect of the picture.

The French consider a landscape is no picture unless it has three planes or parts. The first plane is the foreground, the second plane the middle distance, and the third plane is the extreme distance. Endless variety may be given to the composition by varying the size and importance of these. If the extreme distance is absent a shut-in feeling is produced, and a little peep of distance should be got in if possible. If the middle distance is not seen the effect is theatrical, and although a fine landscape may be without a visible mid-distance we know and feel it is and must be there. Both these can, however, to a certain extent, if one or other is absent, be indicated by a floating cloud or a printed-in sky. In fact, by carefully selecting and printing-in a sky, we can give quite a different character to a picture; but it is important that a suitable sky be chosen in accordance with the feeling of the scene and the impression on the eye that we wish to produce. If the foreground is omitted all strength goes out of the picture.

Lastly, if the mid-distance and extreme distance are absent, the photograph is no longer a landscape, it is merely a study; and even in the latter it is better to have some gap in a hedge or open gate or window to catch a glimpse of distance.

What applies to landscape in general applies to groups and figures also. In making a study or landscape try to catch the expression of your model or the character of the scene.

Above all things, never copy. In the words of a well-known author, 'Copying the work of others utterly stunts imagination and self-dependence.' It is important not to do this, for we must in the long run depend on ourselves. It is better to get into the habit of depending on yourself at first and for ever. Let us be self-reliant; do not let us be self-conscious, but humble, knowing

that in making pictures our best attempts are far behind the great masters who have made their names famous in the great world of art.

If we study nature we shall have the reward of the pleasure she gives only to students; but let us watch her varied expressions and take her with her 'best face on,' so to speak, and she will reward us with many a lovely picture to remind us of summer days and brilliant sunshine while sitting by the winter's fire.

RECOVERING WASTES.

It is customary with some photographers to mix their gold with their silver residues, as they say the bullion dealer will allow for the gold in the recovered metal, according to a 'parting assay note.' This is so to a limited extent only, for if a very small proportion of gold be mixed with a large one of silver, as a rule no allowance will be made, as it is said its separation will not pay. Such gold, however, is not wasted by the refiner, as the silver containing it is utilised in parting. Parting, it may be explained, is accomplished by dissolving out the silver with acid, and this can only be done when the alloy contains at least two parts of silver to one of gold; otherwise the gold will protect the silver from the action of the acid, and, if the attempt were made to dissolve the gold, the silver would act as a protection by forming the chloride. Hence, if the proportion be less than that stated the alloy must be remelted with more silver. Then silver containing ever so small a proportion of gold can be profitably utilised. The minimum of gold allowed for by most refiners must, we believe, exceed five grains to the troy pound. From this it will be seen that an amount of gold residue, which if kept by itself might be valuable, would, if mixed with a large quantity of silver, become practically worthless so far as the photographer is concerned.

REDUCING OVER-PRINTED PRINTS.

The directions given by Mr. W. H. Sherman for doing so are as follows:—Dissolve one ounce of ferridcyanide of potassium (red prussiate of potash) in one pint of water for a stock solution. Break up one pound of carbonate of ammonia into lumps so that it may be put into a five-pint bottle, after doing which fill the bottle with water. After dissolving all that will dissolve a part of the solid mass will remain at the bottom, and the solution will be saturated.

After toning and fixing the day's prints as usual, including those that are darker than desired, remove all but the latter to the salt water, leaving the dark ones in the hypo. Now take a clean white pan, large enough for the largest print which you wish to reduce, and pour a sufficient quantity of your fixing bath into it. Add a little of the ammonia solution, say about one drachm to the quart of hypo; then add enough of the prussiate of potash to colour the compound to a light lemon colour. Immerse one print at a time and let it remain until it is changed to suit the taste, then return it at once to the fixing bath. Proceed with each one in turn in the same manner, and when all are done place them with the others in the salt water.

CARBON PRINTING IN A NUTSHELL.

Relative to this, Mr. H. J. Burton, in The British Journal of Photography, says: You buy your tissue ready sensitised, place it upon the negative in an ordinary printing frame, time the exposure in the most simple manner with the actinometer, take the exposed tissue from the frames and place it in cold water with pieces of single transfer paper, lift them out and force together with a squeegee, place between blotting boards for a few minutes, until, say, half a dozen pictures have been thus treated, then, beginning with the first, simply develop them in warm water. When done, a rinse in cold water stops the further action; a few minutes in a solution of alum, and a final rinse in cold water, completes the operations. Nothing can be much

more easy and simple than this. I always buy my tissue sensitive and cut to the sizes I want to use; I have had it several colours. It comes cheaply per post, and I have found it in good condition for days after I have received it. But this simple and easy process does not suit negatives taken in the ordinary manner, as it inverts the image, making the left hand appear right and *vice versâ;* however, it happens that with the employment of dry plates we have a ready mode of overcoming this difficulty by simply putting the plates in the slides with the glass side toward the lens instead of the coated side.

TRANSFEROTYPES.

THE 'transferotype' is a method of printing upon paper which is supplied by the Eastman Company, and which, having been once achieved, in the sense of a good picture having been obtained, is capable of being made use of in a variety of ways.

A sheet of the transferotype paper having been exposed to light under a negative is developed. If it is ultimately intended for, say, an opal picture, then the development is carried no further than is shown on its surface, as being a good picture, pure in the whites and perfect in the details. But if it be intended for a lantern or stereoscopic transparency, then is the development carried a little further—so far, indeed, as to obliterate the details in a larger degree, leaving only the very highest lights immaculate.

At this stage the development is arrested and the photograph is fixed, washed, and held in readiness for transferring. If for an opal picture, the development, as stated, is such as to show a good image on the paper. In either case, whether for opal or transparency requirement, the paper containing the picture, after having been fixed and washed, is laid down upon and squeegeed into contact with its future receptacle.

By developing with pyrogallic acid a pleasant dark brown tone is obtained, but the best results are obtainable by the ferrous oxalate developer; a solution of four parts of neutral potassium oxalate with one part of ferrous sulphate, both in saturated solutions, being employed.

After being blotted and allowed to become surface dry, the plate, with its adhering paper, is placed in a flat tray of warm water, when, after about a minute, the paper may be stripped off, leaving the image adhering to the glass.

It will have been divined that the transferotype paper, previous to having been coated with the sensitive emulsion, has received a substratum coating of gelatine of a highly soluble nature, while the emulsion gelatine is soluble in a much less degree. The water in the stripping bath must only be warm enough to dissolve the substratum; if too hot, the transferred film is liable to pucker and partly dissolve at the margins. But by the exercise of ordinary care, such will not be the case.

CHLORIDE OF NITROGEN.

SCIENTIFIC photographers will be interested to learn of a recent addition to the list of light sensitive substances. A German chemist, Dr. Gattermann, has found that chloride of nitrogen is readily acted on by light. Lest some experimentalist may at once wish to try photographic experiments with this body, we hasten to add that it is the most dangerous and powerful explosive known. But as Dr. Gatterman had prepared and experimented with about thirty different samples, he began to think that some fault of the experimenters had caused the previously recorded disasters. But at about his thirtieth preparation the chloride suddenly exploded without apparent cause. At the same moment the sun had broken through the clouds and was shining upon his apparatus. Here, then, was the cause of these spontaneous explosions—chloride of nitrogen is violently dissociated by the wave-motion of light. A piece of burning magnesium was found to have the same effect as the sun.

GELATINE PLATES IN THE TROPICS.

At the London and Provincial Photographic Association Mr. J. T. Taylor said that Eastman once in America made for Anthony & Co. 'tropical plates' of good quality which could be developed with tepid water. He supposed that the emulsion contained chrome alum, tannin, or something analogous.

Mr. Cowan said that if fixed finished negatives were treated with chrome alum solution they could be dried over a gas flame. There was no difficulty in making plates which would stand a temperature of 100° Fahr.

Mr. Debenham had not found chrome alum in an emulsion to in any way injure the quality of the plate.

Mr. Cowan stated that not more than half a grain to the ounce could be added, and that about one-eighth of a grain to the ounce was the usual quantity; it made the film more horny and more liable to peel off when cutting the plates. In the tropics operators should put the exposed plates in chrome alum, then wash them before development.

MAGNESIUM FLASH LAMPS.

Here is a description of one of an excellent nature introduced by Mr. W. Bishop early in the year. A metallic spirit lamp, having a flat top, is fitted with two wicks, one in front of the other. Immediately behind this is a reservoir containing magnesium in powder into which dips a glass tube, the other end being carried up through the cork and bent towards the flames of the spirit lamp. A second short tube is passed through the cork, its outer end being connected with the rubber tube of a pneumatic ball. On giving this ball a quick, sharp squeeze a small quantity of the powder is suddenly ejected against the flame, this being attended by a dazzling flash. This is capable of being repeated as long as any powder remains in the reservoir.

The lamp of Mr. H. M. Hastings is very simple. A plain glass tube has an ordinary 'thistle' as a terminus at one end (as readily procurable from every dealer in glass tubes), and a single turn or loop is formed in the tube in the middle by softening it in a spirit lamp and giving it a loop turn, leaving the main body of the tube in a straight length as before. Now, if the tube be charged with powder by pouring it in at the wide end, it stands to reason that none of it will get lost or spilt, as it will all be arrested at the turn of the tube, and when the puff of air from the pneumatic ball is subsequently sent through the tube, it performs its function so thoroughly as to eject the powder without leaving a trace of it behind. Of course, either end of the glass tube may be directed towards the flame; the larger one seems advantageous, as it may aid in spreading out the charge on the principle of the now extinct blunderbuss.

On one end of the tube is sprung a piece of rubber tubing terminating in a pneumatic ball, and on the other end is 'shipped,' by means of a spiral wire, a split brass tube, a spring clip, or any other convenient mechanical appliance, a tube of wire gauze about three inches long and half an inch in diameter packed with asbestos. This tube, which constitutes the lamp, is dipped in a bottle of alcohol and thus becomes charged. It now only remains to light the spirit lamp, and press the ball when the flash follows.

Mr. A. James has devised a lamp which, judging especially from the results obtained, appears to be eminently successful. An ordinary Argand gas burner is employed, the glass chimney being removed, and a stream of magnesium is ejected into the flame from the orifice of a tube in the middle and below the level of those through which the gas is emitted.

On lines somewhat analogous, although differing in a material degree, is a lamp, the invention of Professor Redwood. In this there are two circular wicks (Argand fashion) rising from the top of a spirit lamp, and both are inclined towards each other, so that the two flames combine. To each is the magnesium powder supplied through a tube below, and both tubes are supplied

from a small reservoir of the powder, over which, when charged, a lid fits tightly. The powder is ejected in the usual way, viz., by means of a pneumatic ball and rubber pipe, connected with a brass tube which is fixed in the reservoir. This angular arrangement of the burners ensures perfect combustion, and also distributes the flame over a larger area. The lantern in which it is enclosed is of japanned tin, bright on the inside, and bent in a cylindrical form. There is no glass in front, but a sheet of white blotting paper is fixed in front and held by a suitable clip, and when the powder is ignited it becomes powerfully illuminated by a soft light, like that from a white, luminous cloud. This prevents that glare which is so oppressive to the eyes of the sitter, softens the shadows, and harmonises with the conditions under which daylight portraits are taken, as the area of illuminated paper in front of the lantern is considerable, or about two feet square.

PHOTOGRAPHY AT KEW OBSERVATORY.

We learn from the Report of the Kew Observatory that the photo-heliograph is no longer used there for solar photography, so greatly have observatories for the purpose multiplied at home and abroad. It is now only used as an ordinary telescope by means of which the counting of sun spots is carried on. A comparatively new branch of photography there is the taking negatives of clouds. This is done simultaneously from two points with the view of determining their positions and motions.

POST-MORTEM PHOTOGRAPHY.

One very useful application of the magnesium flash light lies in the direction of post-mortem photography. Any one who has had much experience in this unpleasant—often painful—phase of photography knows full well the many difficulties that usually have to be encountered. By no means the least of them is the question of lighting. In most instances it is impossible to move the body into a more favourable position, and, in some cases, the window blinds even are not allowed to be opened. Hence the unfortunate operator is often put to his wits' ends to secure a properly exposed negative. Much of this difficulty may now be overcome by the use of magnesium powder. This, when employed with discretion, will enable negatives to be secured which would otherwise have been impossible. In its employment it may be advantageous to burn the powder, in different quantities, in more than one part of the room, in order to avoid over-intense shadows. However, when this is done the combustion of the different lots need not be simultaneous, as in the case of the living model.

TONING TRANSPARENCIES.

A convenient bleaching solution is made by dissolving forty grains of bichromate of potash and ninety minims of hydrochloric acid in a quart of water, or the two substances may be kept in concentrated solution in the same proportion, and a few drops added to a small quantity of water as required for use. This solution leaves a beautifully clean image of pure chloride of silver after careful washing, and at the strength given exercises no inconveniently rotting action upon the film either of collodion or gelatine. With the latter, especially on paper, it is liable to produce a faint stain, sometimes pale yellowish brown, at others a dirty green, from reduction of the chromic salt. After a more or less prolonged exposure to light and the application of a well-restrained developer, either ferrous oxalate or ferrous citro-oxalate images of great beauty are produced, which are capable of further toning with gold or platinum. The colours are warmer and more beautiful with collodion than with gelatine, owing, no doubt, to the modifying action of the latter. With collodion pictures pyro and alkali (preferably carbonate of ammonia) give also very

pleasing tints, which for transparencies or opals require no toning, but the best colours given by pyro are when the image is partly converted into bromide.

If a mixture of the haloids be preferred, the easiest mode of procedure is to substitute for the hydrochloric acid in the above solution one drachm (by measure) of sulphuric acid, and to add to this solution soluble chloride, bromide, and iodide, in the proportions desired, bearing in mind that the iodide will displace both bromine and chlorine, and bromide the chlorine, from their combination with silver. Therefore the proportion of iodide, if any be used, must be extremely minute, and the same with the bromide, otherwise there will be little, if any, chloride of silver in the bleached image. This solution should never be used a second time.

DEVELOPERS FOR GELATINO-CHLORIDE PAPER.

Dr. E. A. Just recommends the following :—

1. *For a reddish-brown tone*, similar to that of prints upon albumenised paper :—

(A)	Water	34	ounces.
	Potassic oxalate	3	,,
(B)	Water	18	ounces.
	Ferrous sulphate	6½	drachms.
	Citric acid	30	grains.
	Bromide of potassium	3	,,

Shortly before using mix by pouring B into A. The tone may be rendered warmer and the development made slower by the addition of two to six drops of a one to fifty solution of bromide of potassium.

2. *For a blue-black tone:*—

(A)	Water	21	ounces.
	Potassic oxalate	3½	,,
(B)	Water	3½	ounces.
	Ferrous sulphate	1	ounce.
	Citric acid	30	grains.

The addition of from two to ten drops of a one to fifty solution of bromide of potasslum changes the tone from a pure black to a brownish black.

3. *To get sepia tones.*—Develop first in the reddish-brown bath, No. 1, until the half shadows appear, then, before the finer details in the lights come up transfer into the blue-black bath, No. 2. If the picture comes too quickly, rinse with water between the first and second bath. After development, place for a minute, without previous washing, in an acid bath (say, water, 500 parts; acetic acid, 1 part; or water, 1000 parts; hydrochloric acid, 1 part). Then once more in an equal acid bath, and finally in water. Fixing bath, 1 : 10.

EXPERIENCE WITH META-BISULPHITE OF POTASH IN DEVELOPERS.

Mr. Henry R. Procter says :—I have now used pyro preserved with 'meta'-bisulphite of potash for about three years, and never had any indication of deterioration of the developing power of the solution, though an ounce of pyro will last me six months in the winter season. I now use a twenty per cent. solution, containing ten per cent. of bisulphite; and my 'normal' developer contains ten drops of this, four drops of a solution containing ten per cent. potass bromide, and ten per cent. citric acid, and ten to twenty-five drops of a twenty-five volume per cent. solution of am. fort. As the drops are always from the same dropping bottles they cannot vary much in volume, and I should at once notice any material loss of power, especially as I carefully note my exposures. The developer does not fog, while the negative required no forcing.

DRYING THE VERGARA FILM IN FIFTEEN MINUTES.

WHEN the negative has got quite hard to the touch in the methylated spirit bath, blot and place it between two pieces of blotting paper and two good thick mounts about a couple of inches larger than the negative. Bend the whole back so as to produce perfect contact, and secure with three or four indiarubber bands. A couple of thin laths at the edges to prevent unequal pressure of the bands are a great advantage. Place over a hot-air box or in front of a fire, and in about a quarter of an hour the negative will be quite dry. This method, however, is not recommended when time is not of much consequence. It is preferable to dry slowly in about a couple of hours by the same means, excepting the use of heat. If several negatives have to be dried, they may be placed between mounts separately, or several between two mounts. In the latter case they will take longer to dry. They may also be dried between the leaves of a book under a weight, or in any kind of press.

A NEW CHLORIDE OF GOLD.

SOME years ago a new chloride of gold was discovered by Professor Thomsen, but as his results could not be obtained by other chemists, who did not follow his method of production in its entirety, it has been assumed to be a non-proven discovery. Lately, however, by improved methods, he has completely demonstrated the existence of the new chloride; the process is very simple, and the result beyond dispute. All that is required is gold in a fine state of division and a supply of chlorine gas. He took fifty grammes of finely divided gold, obtained by precipitation of the trichloride with sulphurous acid, and thoroughly washed, and dried to the consistency of thick mud, was placed in a weighed glass tube, a rapid stream of the gas was passed under suitable conditions, and the gold end of the tube slightly heated. Being kept afterwards covered with cotton wool, enough of heat was supplied by the process of decomposition to continue that initiated from external sources, and in half an hour the action was completed. The operation was repeated several times with identical results, thus establishing the fixed character of the new salt, whose formula is $Au_2 Cl_4$.

EXPERIMENTS WITH HYDROQUINONE.

HERR KLEFFEL, when experimenting with Captain Abney's formula in which the hydroquinone is in alcoholic solution, had three objections to it:—The development took too long, the alcoholic solution repelled the water used for rinsing, and he did not like the tone of the negative. However, a friend of his who is a chemist and an amateur photographer persuaded him to try the following formula:—

Solution A.

Hydroquinone	5	grammes.
Sodic sulphate	25	,,
Distilled water	300	,,

Solution B.

Crystalline carbonate of soda	25	grammes.
Distilled water	200	,,

To use, mix three parts of A with one of B.

The result at first was very beautiful, but far too slow of coming. A number of accelerators, such as ammonia, sulphate of soda, caustic soda, traces of copper salts, &c., were tried, but all was of no avail, until at last he hit upon the very simple expedient of warming his store of both solutions by setting the bottles into a bath of warm water, when, owing to the warming of the developer, the image appeared rapidly and was fully developed in two or three minutes; the result being that he has drawn up a list of five advantages

which he found to accrue from the use of hydroquinone in the developer, to wit:—(1), This developer gives very delicate negatives, with sharp high lights and beautiful half tones. (2), The negatives are of a beautiful silver-grey colour, and therefore print very rapidly. (3), The image does not go back in the fixing bath, as is so often the case with the ferrous-oxalate developer. (4), The developer does not become coloured, and deposits no chemical sedimentary precipitate as the oxalate developer does, but remains clear until the end of the development, and the developing dishes and measures always remain clean. (5), The developer is as cheap as any other, since the same quantity can be used for developing several plates.

UTILISING A CAMERA AS A CHANGING BOX.

A CORRESPONDENT of THE BRITISH JOURNAL OF PHOTOGRAPHY ('C. G. C.') describes how he effected this. He says:—Having examined my camera box (half plate), I found it measured nine inches wide, twelve long, and ten deep, which gave me ample room to work inside, so I put a duplicate lining (velvet) inside the box, with two slits with sleeves, so that when drawn up you could put your hands through to work inside and change the plates, &c. I find this quite light-tight and much less simple. I place previously in a light-tight tin box, grooved to hold six or twelve plates. I also stick a piece of postage stamp paper on the back of each plate (so as to know them by the touch), and put them into this tin box all the same way, sticking also a piece of paper on one side of the tin box, so that when I take the exposed plates out of the dark slides in my changing box I replace those taken out of the tin box with the others, putting the exposed plates in on the side of the tin box without the piece of paper on it. The light-tight tin box I can carry in my pocket. The duplicate lining must have a third slit, to put the dark slide and tin box through when drawn up. I have only to add that my box is a great success; I have nothing more to carry.

EXTEMPORISING BROMIDE PAPER.

A FEW days ago, writes Mr. W. Ingles Rogers, I desired to produce a bromide print, but found I had no paper in stock. Moreover, the print *had* to be finished that day, and bromide paper could not be obtained nearer than at a town twelve miles from my residence, and I had no immediate means of sending there. Suddenly it occured to me to float a piece of ordinary ready sensitised paper on a solution of bromide of potassium such as I use for developing dry plates. This I did, and after two minutes' floating suspended it to dry. I then exposed it under the negative for five seconds in diffused light, and developed it with the usual ferrous oxalate developer, with the result that the image came up full of vigour and detail. When fixed, washed, and dried, I placed it by the side of another ordinary bromide print, and found the difference to be almost indistinguishable, the only points in which it *did* differ being that it was scarcely so brilliant as the other, and a trifle darker in the shadows, which, of course, might be due to development. On the whole, however, it was satisfactory, and I think that with a little more careful manipulation the result *might have been* better.

I do not know whether this may be regarded as a discovery or not, but as I have never seen the idea mentioned in any of the photographic books or papers, I venture to infer that it might be useful to others in a like extremity.

GELATINE EMULSION FOR LANTERN SLIDES.

MR. G. H. RODWELL recommends the following:—To any one who feels interested in the scientific part of our art-science, and who would like to be able to make his own dry plates, I strongly recommend him to commence operations by making a very slow gelatine emulsion for lantern transparencies

—because this slow emulsion is far easier to manipulate than the more rapid emulsions are. The emulsion requires no cooking, and the light of the dark room need not be so religiously dim as when preparing an extremely sensitive compound, such as is required for instantaneous work.

In beginning to prepare a gelatine emulsion, the first substance we have to deal with is the gelatine. Now there are two different types of gelatine in the market, namely, *hard* and *soft*. Nelson's No. 1 Gelatine may be taken as a type of the soft, and Coignet's Gold Label of the hard variety. There is now in the market several gelatines which are eminently suitable for preparing a thoroughly good plate. Such an one is Heinrich's, a German make, which I have tried, and found to be a thoroughly reliable article. The next two things we require are bromide of ammonium, *or* potassium, and nitrate of silver, both of which are to be obtained of sufficient purity of any photographic dealer.

Suppose we wish to make five ounces of emulsion, which is a convenient quantity to work with, and which will coat fifty plates three and a quarter inches square. First weigh out one hundred grains Heinrich's gelatine, place it in a hock bottle, and pour over it three ounces of distilled water—or good tap water, such as we are blessed with in Leeds, will do quite as well; then add thirty-five grains of ammonium bromide, *or* forty-two grains potassium bromide. Leave the gelatine to soak in the bromide and water for a quarter of an hour or so, then plunge the bottle into hot water, in order to dissolve the gelatine. When dissolved, add fifty-five grains nitrate of silver (in crystals), and shake the bottle vigorously, until the crystals are completely dissolved, after which it will be advisable to set it on one side for half an hour or so, in order to let the froth resulting from the shaking subside. Now we have an emulsion of silver bromide in gelatine, but there is also along with it a quantity of nitrate of ammonium, or potassium, which has been formed by the double decomposition of the silver nitrate and the ammonium or potassium bromide, and which it is necessary to get rid of.

After making the emulsion, and the froth has subsided, pour it into a jam pot or dish, and leave it in a cool place overnight to set. In the morning, or next evening, as may be most convenient, cut out the emulsion with a strip of glass or a paper knife, and squeeze it through coarse canvas into clean water; this will divide it into fine shreds, and enable the water to dissolve out the contained salts more readily than if it was dissolved in a lump. Allow the shreds of gelatine to soak in two or three changes of water for a quarter of an hour each time, and then strain off the water through canvas, or, what is more convenient, a hair sieve, and allow it to drain thoroughly. It is important that it should be left long enough to drain, as the water clings mechanically to the particles of emulsion, and if melted up before being thoroughly drained, the resulting emulsion will be too thin and watery. Five or six hours should be quite sufficient, but, if more convenient, it may be left until the following evening without detriment. When thoroughly drained it may be transferred to a beaker or jar, and then melted by plunging the containing vessel into hot water. When melted add five drachms good methylated spirit, and if the emulsion measures less than five ounces make it up to that bulk with water.

The next operation, previous to coating the plates, is filtering the emulsion, which may be well and quickly accomplished by passing it through a piece of thoroughly clean washleather, which is fixed on the end of an Argand lamp chimney by means of a rubber ring. Before coating the plates must be thoroughly cleaned.

Next, we shall require an accurately levelled surface, which may be a piece of plate glass, a slab of slate or marble, or even a well-seasoned board, if planed perfectly level. Take a plate upon the pneumatic holder, and pour a measured quantity of emulsion upon it, then carefully guide the pool of emulsion all over the plate, taking care to avoid air bubbles. When coated, gently detach it from the holder and transfer it to the levelled slab to set, then

proceed to coat another plate. By the time three dozen or so are coated the first plates will be set and ready to transfer to the drying box, and so on until all the emulsion is used up. A drying cupboard is not absolutely necessary.

The plates will dry well in any well-ventilated dark room, but will take longer to dry, and be in more danger of dust adhering to the film, and so causing pinholes and spots in the negative, than if dried in a properly constructed drying box, in which the plates will be thoroughly dry in from six to twelve hours. So I should strongly advise any one who intends making his own plates to make a good drying box to begin with, as it will prevent a lot of vexation afterwards.

The developer I prefer is pyro and ammonia in the following proportions:—

Liquor ammonia, ·880	1 drachm.
Bromide ammonium	1 ,,
Water	1 pint.

Add one grain of dry pyro to one ounce of the above. If still warmer tones are required, the proportion of bromide in the above developer may be increased; but the natural tendency of these slow plates is to give warm tones, much more so than with the quicker plates in the market.

PERFECTED IRIS DIAPHRAGMS.

SOUND optical principle demands a circular diaphragm, and in that applied to the orthoscopic lens of a quarter of a century ago circularity was conspicuous by absence. Talking this over with Mr. Wray, the well-known optician of Highgate, London, he said that our objection was no longer tenable; and in proof of it he has sent us a 10×8 lens of the rapid rectilinear or aplanatic type thirteen inches focus, with an aperture an eighth of its focus and stepping down, by easy intermediate stages, numbered at intervals, to $\frac{f}{64}$. Throughout the whole series of movements, from full aperture to the very small opening indicated by the figures just given, the beautiful circularity maintained from the Alpha to the Omega of the movement is such as to disarm the most hypercritical. This arises doubtless from the twofold cause that there are no fewer than ten blades or wings in the Iris system, and that they are operated from a point as far removed from the fulcrum or centre of rotation of each as possible. Any way, be the mechanical details what they may, the result conforms to our ideas of what a perfect diaphragm ought to be.

Regarding the lens, as a lens, the reputation of Mr. Wray is so high as to render critical remark unnecessary. Aplanatic in a high degree, it works with full aperture.

VOIGTLÄNDER'S NEW WIDE-ANGLE LANDSCAPE LENS.

GRAVE difficulties which existed in the fabrication of the new Jena glass having now been overcome, it is beginning to exercise an influence upon the construction of lenses. Messrs. Marion & Co., Voigtländer's agents, sent us one executed by this optician. It is a wide-angle landscape one, covering 12×10 perfectly, with a focus of nearly $11\frac{1}{2}$ inches. Meniscus in external form, it is composed of two elements cemented together in optical contact. The glasses employed for these are produced on quite new principles, and come from the manufactory at Jena, and their optical properties are entirely different from any other hitherto known optical glasses. Both the glasses are extremely light, and of little dispersive power in proportion to the index of refraction; thus, the lens occupying the place where in other objectives stands a flint glass, in its properties resembles rather more a crown glass lens. By the employment of such glasses essential advantages are obtainable, such as an exceedingly flat field, the consequence of which is a very large angle of view (76°); and also the distortion of straight lines, being near the margin of the picture, has been reduced to a minimum. The chromatic aberration is per-

fectly corrected, and as to the spherical aberration, the lens will be found to work with an aperture affording an intensity of light which allows it to be used for instantaneous work.

Ours is, as already said, one for 12×10 pictures, although they are issued in ten sizes, representing pictures from 5×4 up to 26×22 inches, through all the intermediate grades of dimensions. We have worked it both with the largest and the smallest diaphragm, and find that it entirely bears out all that is said above concerning it.

DALLMEYER'S RECTILINEAR LANDSCAPE LENS.

Mr. Dallmeyer has, during the year, introduced a landscape lens that is rectilinear, or giving pictures that are free from distortion. We need scarcely remind our readers that landscape lenses formed of a single or consolidated mass of glass having a diaphragm in front, cause distortion of the image. This is an invariable concomitant of such lenses. But the innumerable subjects which come under the category of landscapes prevent the necessity for the employment of non-distorting lenses from being adequately appreciated for such purposes, and there is a very widespread belief that for photographing pure landscapes a single or landscape lens possesses advantages over a combination in regard to the obtaining more vigour arising from there being less flare or false reflections.

In the new lens Mr. Dallmeyer has made a species of compromise between the purely landscape lens and the rectilinear combination, and he has effected this by displacing one of the crown elements of his triple landscape objective and transferring it in a reversed position to the opposite side of its *confrères*. It is known to those who have studied this landscape lens that when one of its crown elements is removed a flint negative and crown positive still remain, in which there is little or no power either for magnifying or diminishing. It is, however, a powerful corrector of the aberrations of the third element. Telescopists also are aware of this in the case of triple telescopic objectives. In Mr. Dallmeyer's new lens he makes, as it were, a separate element of these two glasses, and turns the convex surface towards the diaphragm; while immediately behind he places the crown meniscus, by which the focus is determined. As the concave surfaces of both are next each other, there is thus an air space left between them. We here give a drawing of the lens from which its configuration will be seen. It covers the field sharply and well, and gives an image quite free from distortion.

WRAY'S CASKET LENSES.

In connexion with an editorial article on the subject of caskets of lenses in The British Journal of Photography, Mr. W. Wray, optician, Highgate, has sent us one of a class he has for some time been manufacturing. It is intended for 5×4 pictures, and consists of a mount, with Iris diaphragm, and three lenses of focus respectively of five inches, seven and a half inches, and ten inches. This power, it will be seen, gives great latitude in the selection of subject to suit the above size of plate. Those lenses not in use in the mount are packed in a neat little cabinet which may be carried in the pocket.

A feature of much ingenuity and convenience in connexion with the Iris diaphragm is this, that there is engraved on the mount a special graduated scale for each focus, none interfering with the other. In the case of the five-inch focus the aperture scale extends from $\frac{f}{8}$ to $\frac{f}{64}$, passing through the inter-

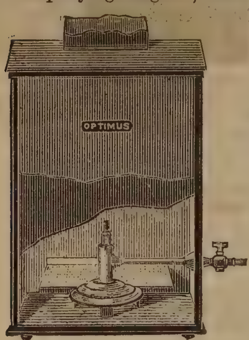
mediate grades of 11, 16, 22, 32, and 45. In those of longer focus, the ten-inch for example, the maximum aperture is graded to commence at $\frac{f}{16}$ extending to $\frac{f}{64}$. This, as we have said, is a very valuable feature, each of the three graduations being complete in itself. The quality of the lenses, as proved by their work on the camera, is unexceptionable, the mechanical workmanship throughout being also of high class.

A DETECTIVE LENS.

WITH a view to cover a quarter plate with a short focus and a large angular aperture, so as to be suitable for snap shots with a detective camera, Messrs. Taylor (Leicester) have introduced a lens to fulfil this requirement. A noticeable feature in its construction is the globular form of the lens, which looks as if, like the now extinct American globe lens, its surfaces formed part of a sphere. This, it will be readily conceded, is favourable to the transmission of a very oblique ray. The objective, then, is composed of deep menisci, and is, therefore, a wide-angle one. But it is, also, unlike wide-angle lenses generally, corrected so as to bring a large bundle of rays to a focus, its angular aperture being $\frac{f}{5 \cdot 6}$. This, it must be conceded, is ample for snap-shutter work. The equavilent focus is four inches.

THE 'OPTIMUS' DARK-ROOM LAMP.

MESSRS. PERKEN, SON, & RAYMENT have introduced a lantern (shown in the accompanying diagram) which presents certain important advantages. It is fitted with a gas jet adjustable from the outside; the light can thereby be readily lessened or increased at will. In front is a sheet of ruby or orange glass (easily removable), behind which is a double thickness of canary fabric in a metal frame, ensuring safety when developing the most sensitive of plates. As development progresses, one of the non-actinic *media* can be removed, and the negative examined by the protection the second medium continues to give, enabling the amount of detail to be judged with certainty. In this lamp the joints are all perfectly light-tight, being made with a double turnover of tin—the upper parts are also held together with rivets. Ventilation is particularly well provided for, as a shaft at back of the lamp, open at bottom and top, encourages a free circulation of air.



THE KODAK.

THIS is an ingenious instrument of the detective class manufactured and introduced by the Eastman Company. A great deal of that ingenuity for which our American brethren are so famous has been imported into the construction of the various parts of the instrument. Externally it is a square leather-covered case, six and a half inches long by three and a half inches square.

But it is in the internal arrangements that American ingenuity is seen in its most pronounced form. A roll holder of a compact nature occupies the rear end, which contains the material for no fewer than one hundred exposures, each of which is brought in succession to the exposing plane by the rotation of the folded winged nut, by which a fresh surface is exposed. This is an operation that is imperative after each exposure.

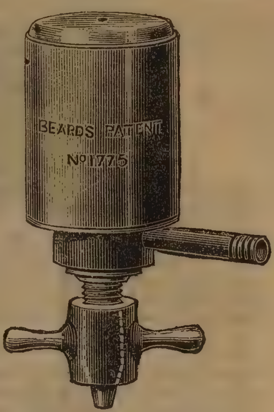
The means for making the exposure are very neat. The lens is encased in

a species of cylinder, which rotates around it in the horizontal direction, and in this there are openings which, when the cylinder is at repose, stand to one side and debar the passage of any light. But this cylinder is geared to a circular running spring ratchet wheel, which is wound up by pulling a string outside, to which a metallic bead is affixed. By this act of pulling, tension is put upon the internal gear to the extent of six exposures; the string runs back into the interior when released.

The dimensions of the pictures are two and a half inches, the shape circular. The lens is small, rectilinear, and of short focus, rendering everything beyond eight or ten feet sharp. The little instrument is becoming very popular. It is invented by Mr. Eastman, of Rochester, N.Y., and is manufactured and sold by the Eastman Dry Plate and Film Company, Oxford Street, London.

BEARD'S SMALL-SIZE AUTOMATIC VALVE.

At the public lantern entertainment of one of our London Societies I saw attached to the gas cylinders an elegant little regulator previously unknown to me. An inquiry revealed the fact that it was a new invention of the ingenious Mr. R. Beard, which renders the use of gas under high pressure not only possible with dissolving lanterns, but a positive pleasure with any kind of limelight. Losing no time in obtaining one from the agent for their sale (Mr. J. H. Steward, 406 Strand, London), I am enabled to supply a brief account of its construction. Its bulk is small, being only $4 \times 2\frac{1}{2}$ inches, and by appliances of a simple nature it can automatically regulate the emission of gas from a cylinder for two or even three lanterns without permitting the slightest variation in the pressure which has been determined upon as that most suitable for any occasion. This it does by means of a spiral spring that applies pressure to a small indiarubber reservoir inside, which, according to its distention, operates through the extending and contracting of 'lazy' levers to move the valve fittings excentrically, and thus opens or closes the orifice of the inlet. Although only as yet a short time in use, they have been tried by lantern connoisseurs with great satisfaction.



A LANTERN WICK TRIMMER.

Objurgations both loud and deep are being constantly indulged in against the lamps of many wicks employed in the optical lantern. When the various complaints are investigated the focal point seems to be the wicks, which, apply the scissors as carefully as you like, will persist, either at one side or the other, in shooting out tongues of flame. Great is the annoyance and offensive the smoke which arise from this source. Happily it is to be a thing of the past. An ingenious American has invented a simple, and, fortunately, a very cheap little machine which is a species of 'cross' between a guillotine, a pair of scissors, and a pair of cutting pliers, and by the use of which all trouble of cutting and trimming the wicks is annihilated. The implement in question is applied to the refractory and offending wick, a lever handle is pressed, and, presto! the end of the wick is cut as straight and fair as if it had been congealed and shaved off with a sharp razor. Messrs. Perken, Son, & Rayment

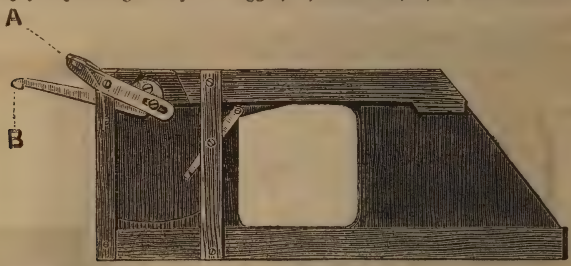
deserve the thanks of the lantern fraternity for introducing this much-felt want.

A VIEW METER.

MR. DALLMEYER's view meter enables us to see pictures in nature in which any desired angle of view is included. Its external form is that of a compact miniature telescope, capable of being carried in the pocket. It contains two lenses, a concave and a convex, and the draw tube being marked so as to suit any required lens and camera it only remains to draw out the tube the proper length, when in the field of view will be seen the precise amount of subject that is eventually to be included on the negative plate.

SELF-CENTREING PANORAMIC LANTERN SLIDE CARRIER.

THIS simple-looking slide carrier contains several features worthy of attention. By simply depressing a key or trigger, A, the lever, B, is made to drive the



slide (partially inserted in the groove) into its place, and it is then automatically centred. On inserting a second the first is pushed forward so as to be removed, but it cannot fall out, nor can a third be pushed along until the first is taken out, hence there is no chance of mistake or breakage. This, too, like Beard's valve, is sold by Mr. J. H. Steward.

RAMSDEN'S TRIPOD.

THAT veteran photographer, Mr. J. W. Ramsden, of Leeds, has introduced a patent 'grand stand' for a camera, which possesses the much-prized advantage of not having a single loose part. It packs in small space, owing to the triangular brass top being hinged together in a peculiar way; and this peculiarity, coupled with the further one of each leg being securely fastened to the folding tripod, renders Mr. Ramsden's tripod one of great value. The triangle opens to a considerable extent, and any or all of the legs can be slidden up and down to provide for inequalities of the ground.

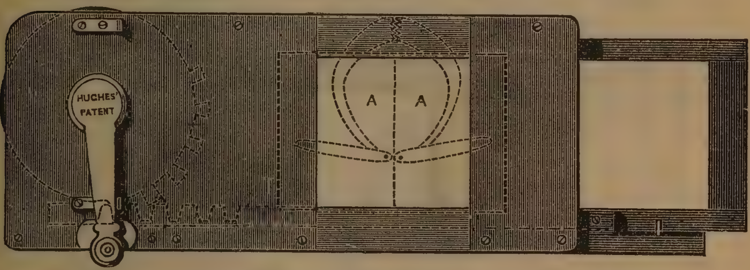
THE SCIENTIST'S LANTERN.

A NEW form of lantern, possessing points of novelty and great usefulness, was recently exhibited before the Physical Society; it was made by Mr. Hughes, of Kingsland. The body is hexagonal, and of mahogany; three adjacent sides are each provided with condensers and projecting arrangements, the back opening to give access to the radiant. The lamp is fixed to the baseboard, and the body can be rotated through an angle of sixty degrees on either side of the central position, thus allowing any of the three nozzles to be directed to the screen. The axes of the three condensers intersect at a point about which the radiant is placed. The right-hand nozzle is for ordinary slide work, and the left is provided with an adjustable slit for spectrum work. A small table

sliding on rails carries the prisms, and the same rails support the projecting lenses. On the occasion in question, the electric light was used as an illuminant, the Brockie-Pell lamp being chosen, Professor S. P. Thompson congratulating the maker on having selected this lamp, on account of many points of advantage it possessed.

A SINGLE LANTERN DISSOLVER.

A NECESSARY adjunct to a well-appointed lantern is what some erroneously term a 'single lantern dissolver,' but is in reality a shutter so constructed as to cut off all light from the screen during the time one slide is being withdrawn and another is taking its place. To get this effected much ingenuity has been evoked. A most effective slide and dissolver combined has been introduced by Mr. W. C. Hughes, of Mortimer Road, Kingsland, London, which I shall attempt to describe with the aid of a diagram. Unlike some others, everything here is complete in the slide or adapter itself.



There is a travelling or running slide-carrier, for holding two slides, runs in grooves or guides in the main frame, presenting in succession each slide directly in the axis of the lenses. At one end of the frame is a handle which, when moved from side to side, effects the following movements :—First, two wings (A A), geared together by a segment of a wheel, instantly dart from the sides of the central aperture in the frame, and cover it up by opposite horizontal movements. No sooner is this done than the running carrier moves from one end to the other, and presents a fresh plate in the axis of the optical system, which operation is, in turn, followed by the flying open of the two shutters, thus exposing the image on the screen. The already exposed slide having been taken away, and another substituted, the handle is moved in the opposite direction, with this result, that those looking at the picture on the screen see it suddenly covered up by two opaque curtains, which meet in the middle, leaving the screen dark for about a second, after which they again open, slowly or fast at the operator's option, revealing another subject on the screen. And thus it goes on. It is ingenious, and the effect is pretty.

VARYING SIZES OF DROPS.

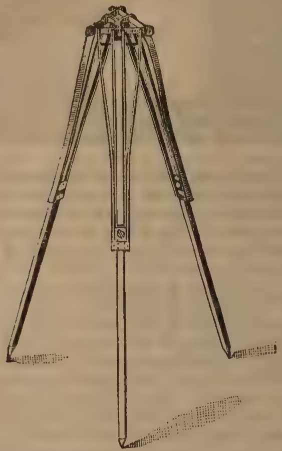
MR. A. F. REID by a series of experiments has cast much light on the varying factors governing the sizes of drops. In deciding upon the dropping instrument he finally chose a pipette holding a hundred grains of water. He noticed that when using a burette the drops varied in size according to the position of the tap. He found, first, that the size of the drops was governed by the time taken in delivering them ; thus, when water just above freezing was dropped at the rate of half a drop per second, the pipette delivered one hundred and forty-one drops before emptying itself, while one hundred and thirty-six was

the number when they fell at the rate of two or three per second. He next observed a diminution of size in the drops as the temperature increased, his pipette giving one hundred and thirty-seven at four degrees C. over freezing, and one hundred and fifty-six at seventy-seven degrees. Near freezing point, he says, the quantity delivered is increased by ten drops for every ten degrees Fahr., and by one drop at higher temperatures. When the water contained some substance in solution the drops were smaller in size ; but the difference is slight according to his figures—from one to one and a half per cent. Compared with water, the following results are very remarkable—drops from the same pipette when the liquids named were used :—

Absolute alcohol	387 drops.
Ether	452 ,,
Bisulphide of carbon	428 ,,
Sulphuric acid	340 ,,
Hydrochloric acid	182 ,,

ASHFORD'S CAMERA STAND.

THE stand of J. Ashford, 179 Aston Road, Birmingham, which we have had occasion to subject to the test of actual practice, differs from any others we have previously seen, inasmuch as a species of compound triangulation has been adopted in its construction.



The construction of the stand is shown in the above cut. For its lightness it is a marvel of strength and rigidity.

THE LEEDS SHUTTER.

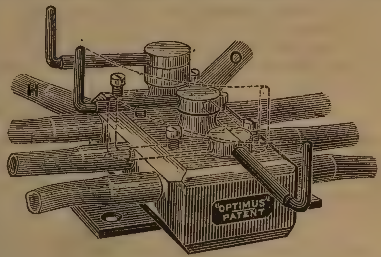
A FURTHER modification has been made in the well-known Phœnix shutter by Messrs. Reynolds & Branson, of Leeds. It has been greatly simplified in construction and considerably lowered in price. With these changes it has also adopted a new name, namely, 'The Leeds Shutter,' which we do not imagine is intended to wholly supplant its respected forerunners of the same flap-and-drop family. It responds readily to the slightest pressure on the pneumatic ball.

A TANK SYPHON.

Mr. W. Tylar, of Birmingham, has introduced a useful appendage to the washing tank, consisting of a syphon of a peculier construction by which the water charged with saline matter can be drawn off, fresh water taking its place. The construction is ingenious. It fits any vessel.

A LANTERN DISSOLVING TAP.

Many triple taps have been devised, but they are mostly noticeable by their complexity of parts and by the confusing maze of tubes crossing and recrossing in various directions, so confusing to even experienced operators; beside which they are very apt to become disconnected, so creating danger. Such difficulties and dangers are obviated in the 'Optimus' Triple Dissolver. The supply pipes (marked H and O respectively) descend from the bottom of the tap to the bags or bottles. The outlet pipes (each marked H and O) are connected with the respective jets of the lantern in order as they stand; that is, the pair at top of the dissolver are connected with the top jet, the pair in centre with the middle jet, and that at the base with the lower jet. A lever of simple construction and easy movement governs each pair of outlet tubes. These levers are arranged so that they can be worked jointly by the operator's hand. He can, at will, employ one lantern only, or he can combine the lower two, the upper two, the top and bottom ones, or all three together. If from any cause one or two of the lanterns are not required, the levers controlling them can be locked. By-passes secured by screw arrangement are included. Bulk and weight are greatly reduced. Add to these important *desiderata* the great simplicity of construction, and the ease with which it can be cleaned out (every part unscrewing for that purpose), and this must be acknowledged as a most important invention.



MOUNTING STEREOGRAPHS.

No pictures should ever be mounted so as to exceed three inches apart, but, if possible, a quarter of an inch less should invariably be preferred; and no picture should have so much subject shown on the left-hand margin of the left-hand picture as displayed on the left hand of the picture on the right, and *vice versâ* with respect to the right hand. That on the right-hand side of the mount should show less subject, laterally, than on the left side picture. The effect of this is to cause the whole subject to be seen as if it were projected behind the mount. Now this in itself is a very pretty effect, for when the elements of the binocular picture are mounted so as to leave a portion of the mount, if only the sixteenth of an inch, between the two pictures, then is the picture seen projected as through an opening in an opaque frame.

SINGULAR STEREOSCOPIC EFFECT.

A very singular effect is produced when a photograph of the roof of an interior, or even a railway bridge, when taken from below, is viewed in the stereoscope. It is an altogether unmeaning thing until the stereoscope with its picture is pointed upwards, when the subject is adequately realised by the spectator.

FETID-SMELLING ALBUMENISED PAPER.

A CORRESPONDENT of THE BRITISH JOURNAL OF PHOTOGRAPHY puts an old and a vexed question which has never yet been settled with any degree of certainty, namely, Are prints made on the highly offensive-smelling albumenised paper supplied by some dealers likely to prove more fugitive than those made on paper prepared with undecomposed albumen, or fresh white of eggs? Further, whether blood albumen, under any circumstances, can yield such permanent prints as ova-albumen? For our own part, we may say that we have many prints which we know were printed on albumenised paper of a most offensive character more than a dozen years ago, which at present show no signs of fading, while others, made since on similar paper, have almost disappeared. On the other hand, we have others made on unmistakably fresh albumen which have behaved in a precisely similar manner—some have faded, others have lasted. Still, the question is an important one, and well worthy of discussion.

OBERNETTER'S ENGRAVING PROCESS.

A NEGATIVE is taken from the original, and this negative itself is converted into a chloride of silver positive, and then placed in contact with a perfectly flat plate of copper. The quantity of chloride of silver thus deposited upon the metal corresponds exactly to the intensity of the original—in the darker parts there is a denser, in the lighter parts a slighter deposit. By a simple galvanic process (immersion in a galvanic cell kept in action by two of the smallest kind of dynamo machines) the chloride of silver is decomposed and replaced by a soluble chloride and metallic silver. The copperplate is thus hollowed out, the depths corresponding to the amount of chloride of silver at each place on the plate when placed in the cell. Thus the amount of light and shade depends absolutely upon the proportions of chloride of silver present on that picture, and does not depend at all upon the phantasy of the etcher. An advantage Herr Obernetter claims for his process is, that while usually several weeks are required to prepare a printing plate, he can, given a perfect original, prepare the largest size of copper lichtdruck printing plate in a couple of days, from which 21,000 prints can be got, the last as good as the first. Of course, such a plate requires to be frequently resteeled.

RE-STEELING COPPERPLATES.

THE copperplate to be refaced first has all ink removed from its surface by chloroform or turpentine, is then washed and carefully dabbed over with a hog's-hair brush dipped in a potash lye or in a five per cent. solution of cyanide of potassium, then washed again. The plate is next laid into a flat bath, along the bottom of which a bare copper wire is laid, which is to serve as the negative pole of the current. The appropriate steel-depositing fluid is then added, so as to avoid oxidation. A plate of pure steel serves as a node; it is placed at the positive pole above the copperplate when the current is opened. A silvery-like film of steel is immediately deposited upon the copperplate. Air bubbles are easily removed with a feather. The plate should be completely steel faced in about five minutes. The composition of the fluid used is as follows :—

Dissolve in warm water	1	litre.
Chloride of ammonium	60	grammes.
Crystallised ferric sulphate	30	,,
Crystallised ammoniac ferrous sulphate	30	,,

The solution should stand two days and be twice altered, and should be filtered again before each time of using. After the facing is completed the plate should be cleaned as before and greased to prevent it from rusting.

OBERNETTER'S EMULSION.

THE *Moniteur de la Photographie* gives the formulæ employed by Herr Obernetter in the preparation of his emulsion :—

Crystallised carbonate of soda	10 grammes.
Citric acid	8 ,,
Water	100 ,,

Heat gently until carbonic acid ceases to be given off, then add 50 grammes of Heinrich's gelatine dissolved in 500 grammes distilled water. Dissolve separately 100 grammes of nitrate of silver in 200 grammes distilled water. Add this silver solution to the gelatine solution, stirring all the time, then rinse out the glass that contained the silver solution with 50 grammes of water, and add this water also to the emulsion. The silver should be dissolved at a temperature between 38° and 68° C. The filtered emulsion is poured into a dipping bath, or other suitable vessel, and after it has set it is cut up into small pieces and placed in a vessel having a capacity of about three litres, and the following solution, at a temperature of from 15° to 17° C., is poured over it :—

Crystallised carbonate of soda	30 grammes.
Bromide of ammonium	100 ,,
Water	500 ,,

Shake up from time to time. At the end of twelve to eighteen hours pour off the supernatant liquid and wash from twelve to twenty-four hours in frequent changes of water. The emulsion is then ready for use. If the emulsion has been placed in alcohol in order to make it keep, and before it is ripened, the alcohol should first be removed by washing in water, and then the emulsion should be melted at a temperature of 88° on a water bath ; it is then allowed to cool down to about 50°, then to every 100 grammes of emulsion 0·66 c.c. of ammonia is added ; the whole is then allowed to stiffen, and is afterwards washed as usual. Both ripe and unripe emulsion may be preserved for an indefinite length of time in alcohol of 70° and upwards. In this way one may have ready prepared emulsion all the year round, all the preparation required being to wash the pieces for a couple of hours in several changes of water.

REDUCING INTENSE NEGATIVES.

MR. JOHN BARTLETT prefers perchloride of iron for this purpose. The best plan is to immerse the negative in a weak solution—

Perchloride of iron	30 grains,
Citric acid	60 ,,
Water	1 pint,

for a minute or two, then wash and pass rapidly through hypo solution, ordinary strength. Be careful not to let the plate remain in the hypo more than a few seconds, as the reduction is very rapid. The operation may be repeated as often as is necessary, so that the exact degree can be obtained, and the operation stopped at once. If a strong solution of iron is used, the shadows suffer, the action taking place uniformly on the whole film ; but if a weak solution is employed, the high lights are attacked first. So that really, if judiciously used, the perchloride of iron may be made to improve the flatness of a badly developed negative, if used strong giving it more brilliancy by making a greater contrast between the lights and shadows.

SENSITIVE PLATES IN THE FRENCH CUSTOM HOUSE.

THE Chambre Syndicale de la Photographie has been endeavouring to arrange that packets containing sensitive plates should only be opened in a dark room by the light of a red lantern. The Director of Customs replied that the goods should only be opened in the presence of the consignee in a dark room

provided with a red lantern, and that a decision to that effect was obtained by a M. Bernard, a photographer, who asked for it, dated as long ago as March 12, 1879. The Chambre Syndicale recommends that each package should have conspicuously written or printed upon it: '*Plaques sensibles. Prière de ne pas ouvrir sans la présence du destinataire*'—'Sensitive plates. Please do not open except in the presence of the consignee'—and that when the request is not attended to, information should be sent to the Chambre, which will take further steps to prevent the recurrence of such an accident. The Chambre Syndicale also intends to try to get this rule recognised by an international Customs agreement. In the Code of Customs there is a note which runs as follows:—'Note No. 335 (Glass objects unspecified—Photographic plates with sensitive gelatino-bromide films, &c.),' which says that, 'Since photographic plates are affected by exposure to light, the boxes containing them cannot be opened in daylight without causing them to lose all or some of their chemical properties. Therefore, the officer charged with their examination, if he has any doubts as to their contents, and has no dark room in his office, should select by chance *one* of these boxes, which he will send to the municipal laboratory to be verified, or he may cause the whole package to be accompanied to the consignee's, where it shall be opened, and where all the necessary precautions can be taken as to the removal of the coverings.'

UNFIXED NEGATIVES.

CHROME alum and citric acid is stated to be of great service on journeys for bringing home the negative unfixed. The following is the prescription:—Sixteen grammes chrome alum and four grammes citric acid are dissolved in one litre of water, and in this bath is placed the developed and lightly rinsed plate, and development is at once arrested. After two minutes the plate is washed finally with a little sugar, then dried and packed. On arriving home the plates must be well washed before fixing, otherwise the citric acid will decompose the sodium hyposulphite. This chrome alum bath is also an excellent means of clearing such plates as have become yellow through development with alkaline pyrogallol solution.

A HINT TO TOURISTS IN ITALY.

MESSRS. ROBINSON & THOMPSON say:—For photographing *ruins* of Rome they will have to *show passport* and get permission at office for 'preservation of ancient monuments' situate near the Forum, but *interiors of churches* at various places. For Pompeii, permission at Naples Museum, also for Pæstum. No difficulty about *exteriors* of buildings at Rome, Venice, &c., if not ruins.

BIBLIOGRAPHY.

THE following works have this year been laid on the editor's table in the office of THE BRITISH JOURNAL OF PHOTOGRAPHY:—

Photo-Engraving and Photo-Lithography, by W. T. Wilkinson; *Practical Guide to Printing*, by W. K. Burton; *Burnet's Art Essays* (Reprint); *Spon's Household Manual; Journal of Indian Art; Treatise on Photography*, by Captain Abney; *Idyls of the Norfolk Broads*, by P. H. Emerson; *Retouching*, by Dr. Liesegang; *History of Photography*, by W. J. Harrison; *Retouching made Easy*, by J. Hubert; *Elementary Lessons in Silver Printing*, by W. M. Ashman; *Ex Voto*, by Samuel Butler; *The Photographic Negative*, by Rev. W. H. Burbank; *Letters on Landscape Photography*, by H. P. Robinson; *Scovill's Photographic Instructor; Photographer's Book of Practice*, by W. D. Holmes and E. P. Griswold; *The Book of the Lantern*, by T. C. Hepworth; *Photography for All*, by W. J. Harrison; *Instruction in Photography* (eighth edition), by Captain Abney; *Pictures in Black and White*, by George Mason.

WEIGHTS AND MEASURES.

APOTHECARIES' WEIGHT.

SOLID MEASURE.

20 Grains	= 1 Scruple	=	20 Grains.
3 Scruples	= 1 Drachm	=	60 ,,
8 Drachms	= 1 Ounce	=	480 ,,
12 Ounces	= 1 Pound	=	5760 ,,

FLUID.

		Symbol.
60 Minims	= 1 Fluid Drachm	f. ʒ
8 Drachms	= 1 Ounce	f.
20 Ounces	= 1 Pint	O ʒ
8 Pints	= 1 Gallon	gall.

The above weights are those usually adopted in formulæ.

All Chemicals are usually sold by

AVOIRDUPOIS WEIGHT.

27$\frac{1}{3}$ $\frac{1}{2}$ Grains	= 1 Drachm	=	27$\frac{1}{3}$ $\frac{1}{2}$ Grains.
16 Drams	= 1 Ounce	=	437$\frac{1}{2}$,,
16 Ounces	= 1 Pound	=	7000 ,,

Precious Metals are usually sold by

TROY WEIGHT.

24 Grains	= 1 Pennyweight	=	24 Grains.
20 Pennyweights	= 1 Ounce	=	480 ,,
12 Ounces	= 1 Pound	=	5760 ,,

NOTE.—An ounce of *metallic* silver contains 480 grains, but an ounce of *nitrate* of silver contains only 437$\frac{1}{2}$ grains.

FRENCH WEIGHTS AND MEASURES,

AND THEIR EQUIVALENTS IN ENGLISH.

1 Cubic Centimètre	= 17 minims nearly.
3$\frac{1}{2}$,, ,,	= 1 drachm.
28·4 ,, ,,	= 1 ounce.
50 ,, ,,	= 1 ounce 6 drachms 5 minims.
100 ,, ,,	= 3 ounces 4 drachms 9 minims.
1000 ,, ,, or 1 litre, = to 61 cubic inches	= 35 ounces 1 drachm 36 minims.

The unit of French liquid measures is a cubic *centimètre.*

A cubic *centimètre* of water measures nearly 17 minims (16·896); it weighs 15·4 grains, or 1 *gramme.* A cubic *inch* of water weighs 252·5 grains.

The unit of French weights is the gramme = to 15·4 grains; thus a drachm (60 grains) is nearly 4 grammes (3·88). An easy way to convert grammes into English weight is to divide the sum by 4, which gives the equivalent in drachms very nearly thus :—

Grammes.				Drachms.		Oz.		Drachm.		Grains.
100	÷	4	=	25	=	3	,	1	+	43

TABLE FOR ENLARGEMENTS.

Focus of Lens, inches.	TIMES OF ENLARGEMENT AND REDUCTION.							
	1 inches.	2 inches.	3 inches.	4 inches.	5 inches.	6 inches.	7 inches.	8 inches.
2	4 4	6 3	8 $2\frac{3}{4}$	10 $2\frac{1}{2}$	12 $2\frac{2}{5}$	14 $2\frac{1}{3}$	16 $2\frac{2}{7}$	18 $2\frac{1}{4}$
$2\frac{1}{2}$	5 5	$7\frac{1}{2}$ $3\frac{3}{4}$	10 $3\frac{1}{3}$	$12\frac{1}{2}$ $3\frac{1}{8}$	15 3	$17\frac{1}{2}$ $2\frac{11}{12}$	20 $2\frac{6}{7}$	$22\frac{1}{2}$ $2\frac{13}{16}$
3	6 6	9 $4\frac{1}{2}$	12 4	15 $3\frac{3}{4}$	18 $3\frac{3}{5}$	21 $3\frac{1}{2}$	24 $3\frac{3}{7}$	27 $3\frac{3}{8}$
$3\frac{1}{2}$	7 7	$10\frac{1}{2}$ $5\frac{1}{4}$	14 $4\frac{2}{3}$	$17\frac{1}{2}$ $4\frac{3}{4}$	21 $4\frac{1}{5}$	$24\frac{1}{2}$ $4\frac{1}{12}$	28 4	$31\frac{1}{2}$ $3\frac{15}{16}$
4	8 8	12 6	16 $5\frac{1}{4}$	20 5	24 $4\frac{4}{5}$	28 $4\frac{2}{3}$	32 $4\frac{4}{7}$	36 $4\frac{1}{2}$
$4\frac{1}{2}$	9 9	$13\frac{1}{2}$ $6\frac{3}{4}$	18 6	$22\frac{1}{2}$ $5\frac{5}{8}$	27 $5\frac{2}{5}$	$31\frac{1}{2}$ $5\frac{1}{4}$	36 $5\frac{1}{7}$	$40\frac{1}{2}$ $5\frac{1}{16}$
5	10 10	15 $7\frac{1}{2}$	20 $6\frac{2}{3}$	25 $6\frac{1}{4}$	30 6	35 $5\frac{5}{6}$	40 $5\frac{5}{7}$	45 $5\frac{5}{8}$
$5\frac{1}{2}$	11 11	$16\frac{1}{2}$ $8\frac{1}{4}$	22 $7\frac{1}{8}$	$27\frac{1}{2}$ $6\frac{7}{8}$	33 $6\frac{1}{2}$	$38\frac{1}{2}$ $6\frac{5}{12}$	44 $6\frac{2}{7}$	$49\frac{1}{2}$ $6\frac{3}{16}$
6	12 12	18 9	24 8	30 $7\frac{1}{2}$	36 $7\frac{1}{6}$	42 7	48 $6\frac{6}{7}$	54 $6\frac{3}{4}$
7	14 14	21 $10\frac{1}{2}$	28 $9\frac{1}{3}$	35 $8\frac{3}{4}$	42 $8\frac{2}{5}$	49 $8\frac{1}{6}$	56 8	63 $7\frac{7}{8}$
8	16 16	24 12	32 $10\frac{2}{3}$	40 10	48 $9\frac{3}{5}$	56 $9\frac{1}{3}$	64 $9\frac{1}{7}$	72 9
9	18 18	27 $13\frac{1}{2}$	36 12	45 $11\frac{1}{4}$	54 $10\frac{4}{5}$	63 $10\frac{1}{2}$	72 $10\frac{2}{7}$	81 $10\frac{1}{8}$

THE object of this table is to enable any manipulator who is about to enlarge (or reduce) a copy any given number of times, to do so without troublesome calculation. It is assumed that the photographer knows exactly what the focus of his lens is, and that he is able to measure accurately from its optical centre. The use of the table will be seen from the following illustration:—A photographer has a *carte* to enlarge to four times its size, and the lens he intends employing is one of six inches equivalent focus. He must, therefore, look for 4 on the upper horizontal line, and for 6 in the first vertical column, and carry his eye to where these two join, which will be at 30—$7\frac{1}{2}$. The greater of these is the distance the sensitive plate must be from the centre of the lens; and the lesser, the distance of the picture to be copied. To *reduce* a picture any given number of times the same method must be followed, but in this case the greater number will represent the distance between the lens and the picture to be copied; the latter, that between the lens and the sensitive plate. This explanation will be sufficient for every case of enlargement or reduction.

If the focus of the lens be twelve inches, as this number is not in the column of focal lengths, look out for six in this column and multiply by 2, and so on with any other numbers.

THERMOMETRIC TABLES,

SHOWING THE ASSIMILATION OF THE THERMOMETERS IN USE THROUGHOUT THE WORLD.

Celsius.	Réaumur.	Fahrenheit.	Celsius.	Réaumur.	Fahrenheit.
100	80·0	212·0	49	39·2	120·2
99	79·2	210·0	48	38·4	118·4
98	78·4	208·4	47	37·6	116·6
97	77·6	206·6	46	36·8	114·8
96	76·8	204·8	45	36·0	113·0
95	76·0	203·0	44	35·2	111·2
94	75·2	201·2	43	34·8	109·4
93	74·4	199·4	42	33·6	107·6
92	73·6	197·6	41	32·8	105·8
91	72·8	195·8	40	32·0	104·0
90	72·0	194·0	39	31·2	102·2
89	71·2	192·2	38	30·4	100·4
88	70·4	190·4	37	29·6	98·6
87	69·6	188·6	36	28·8	96·8
86	68·8	186·8	35	28·0	95·0
85	68·0	185·0	34	27·2	93·2
84	67·2	183·2	33	26·4	91·4
83	66·4	181·4	32	25·6	89·6
82	65·6	179·6	31	24·8	87·8
81	64·8	177·8	30	24·0	86·0
80	64·0	176·0	29	23·2	84·2
79	63·2	174·2	28	22·4	82·4
78	62·4	172·4	27	21·6	80·6
77	61·6	170·6	26	20·8	78·8
76	60·8	168·8	25	20·0	77·0
75	60·0	167·0	24	19·2	75·2
74	59·2	165·2	23	18·4	73·4
73	58·4	163·4	22	17·6	71·6
72	57·6	161·6	21	16·8	69·8
71	56·8	159·8	20	16·0	68·0
70	56·0	158·0	19	15·2	66·2
69	55·2	156·2	18	14·4	64·4
68	54·4	154·4	17	13·6	62·6
67	53·6	152·6	16	12·8	60·8
66	52·8	150·8	15	12·0	59·0
65	52·0	149·0	14	11·2	57·2
64	51·2	147·2	13	10·4	55·4
63	50·4	145·4	12	9·6	53·6
62	49·6	143·6	11	8·8	51·8
61	48·8	141·8	10	8·0	50·0
60	48·0	140·0	9	7·2	48·2
59	47·2	138·2	8	6·4	46·4
58	46·4	136·4	7	5·6	44·6
57	45·6	134·6	6	4·8	42·8
56	44·8	132·8	5	4·0	41·0
55	44·0	131·0	4	3·2	39·2
54	43·2	129·2	3	2·4	37·4
53	42·4	127·4	2	1·6	36·5
52	41·6	125·6	1	0·8	33·8
51	40·8	123·8	0	0·0	32·0
50	40·0	122·0			

SPANISH FOR THE PHOTOGRAPHIC TOURIST.

IN THE CUSTOM HOUSE.

Have you anything to declare?	No tengo nada de contrabando?
These are photographic plates which must be kept in the dark.	Estos son platos, ó cristales para fotografiar y deben guardarse à oscuras.
If you must see them, please direct me to a photographer's, and I will open them in his dark room.	Si tiene vd que verlos sirvase dirigirme à un fotografista y eu su cuarto de obrar los abrirè.
Please direct me to the British Consul.	Sirvase dirigirme à la casa del Consul Britanico.

IN A SHOP.

Do you keep? or, Have you?	Tiene vd?
How much is it?	Cuanto es?
A dozen.	Una docena.
One ounce.	Una onza.
Half a pound.	Media libra.

NUMBERS (NUMEROS)

1......Uno.	5......Cinco.	9......Hueve.	20......Veinte.
2......Dos.	6......Seis.	10......Diez.	100......Ciento.
3......Tres.	7......Siete.	11......Once.	50......Cincuenta.
4......Cuatro.	8......Ocho.	12......Doce.	

MONEY (MONEDA) ó (DINERO).

1*d.* = un penique = 10 centimos.	4 reales = 1 peseta, or franc.
2½*d.* = un real.	25 pesetas = 1*l.*

NAMES OF ARTICLES (NOMBRES DE ARTICULOS).

Camera.	Camara para fotografiar.
Lens.	Lente.
Plates (dry plates).	Platos, or Cristales preparados para fotografiar.
Tripod.	Tripode.
,, head or triangle.	Triangulo para tripode.
Screw.	Tornillo.
Focussing cloth.	Tela para la cabeza.
,, glass (ground glass).	Cristal transparente.
Lens cap.	Tapa para lente.
Stops.	Hojitas de hierro enegrecido, con agueros de varios tomaños.
Lamp.	Lampara.
Ruby lamp.	Lampara cristal rojo ó armarillos.
Spirit level.	Nivel.
Corks.	Corchos.
Note book.	Librito para memoranda.
Pencil.	Lapiz.
Candle, candles.	Bujia, bujias.
Night lights.	Mariposas.
Oil (paraffine).	Parafina.
Matches (Vestas).	Cerillos.
Wood matches.	Fósforos.
Dish, dishes.	Fuente, fuentes.
Water.	Agua.

Chemicals (Quimicos).

Pyrogallic acid.	Pyrogalico.
Bromide of ammonium.	Bromido de amonium.
,, potassium.	,, potasium.
Ammonia, ·880.	Amoniaco de ·880 grados.
Hyposulphite of soda.	Hiposulfito de sosa.
Sulphuric acid.	Acido sulfurico.
Citric ,,	,, citrico.
Ferrous oxalate.	Caparrosa verde.
Hydrochloric acid.	Acido hidroclorico.
Nitric ,,	,, nitrico.
Oxalic ,,	,, oxalico.
Tartaric ,,	,, tartarico.
Carbonate of ammonia.	Carbonato amoniaco
Chloride of ammonium.	Cloruro de amonium
Alum, powdered.	Alumbre en polvo.
Alcohol.	Espiritu.
Borax.	Boraj.
Potash bichromate.	Bicromato de potaso.
,, carbonate.	Carbonato de potasa.
,, citrate.	Citrato de ,,
,, neutral oxalate.	Oxalato de potasa neutral
Silver nitrate.	Nitrato de plata.
Soda acetate.	Acetato de sosa.
,, bicarbonate.	Bicromato de sosa.
Distilled water.	Aguar distilada.
Bottles, small, with cork.	Frasquito con corcho.
,, large, ,,	Frasco ,,
,, with small glass stopper.	Frasquito con tapon de cristal
,, ,, large ,, ,,	Frasco ,, ,
Glass measure.	Vaso de cristal para medir liquidos.
Blotting paper.	Papel secante.
Scales and weights.	Balanzas.
Gum.	Goma
Indiarubber rings.	Anillos de goma.
Shellac.	Goma laca.
Cardboard box.	Cajitas de carton.
Tissue paper.	Papel de seda.
Bellows (for camera)	Fuelles (es decir, tela ó cuero en forma de fuelles para el cuerpo de una camara).

CONTENTS INDEX SEE PP. 665-70.

INDEX TO ADVERTISERS, SEE PP. 683-86.

POSTAL AND TELEGRAPHIC ADDRESSES

SEE PP. 859-61.

TABLE OF EXPOSURES FOR ENLARGING.

By E. Ferrero (Referred to in his article, page 452).

SHOWING THE EXPOSURES TO BE GIVEN TO EASTMAN'S AND BRITANNIA-SLOW BROMIDE PAPERS, ACCORDING TO THE ACTUAL INTENSITY RATIO OF THE LENS, AND TO THE ACTINIC POWER OF LIGHT, AS MEASURED BY STANLEY'S ACTINOMETER. BRITANNIA-RAPID BROMIDE PAPER REQUIRES ONE-FIFTIETH OF THE EXPOSURES INDICATED, AND GELATINO-BROMIDE PLATES OF ORDINARY RAPIDITY ONE-FIFTEENTH TO ONE TWENTIETH.

Stanley's Actino-meter.	f/16		f/22		f/26		f/32		f/40		f/48		f/72		f/100	
Seconds.	min.	sec.	min.	sec.	min.	sec.	min.	sec.	min.	sec.	min.	sec.	min.	sec.	min.	sec.
10	0	9	0	17	0	23	0	36	0	55	1	20	3	0	5	47
15	0	13	0	25	0	34	0	54	1	23	2	0	4	30	8	40
20	0	18	0	32	0	46	1	12	1	51	2	40	6	0	11	34
25	0	22	0	42	0	57	1	30	2	18	3	20	7	30	14	27
30	0	27	0	49	1	9	1	48	2	46	4	0	9	0	17	21
40	0	36	1	5	1	34	2	24	3	42	5	20	12	0	23	8
50	0	45	1	24	1	54	3	0	4	36	6	40	15	0	28	54
60	0	54	1	38	2	18	3	36	5	32	8	0	18	0	34	42
70	1	3	1	54	2	42	4	12	6	28	9	20	21	0	40	29
80	1	12	2	10	3	7	4	48	7	24	10	40	24	0	46	15
90	1	21	2	29	3	28	5	24	8	18	12	0	27	0	52	0
100	1	30	2	48	3	48	6	0	9	12	13	20	30	0	57	48
120	1	48	3	16	4	36	7	12	11	5	16	0	36	0	69	24
140	2	6	3	48	5	23	8	24	12	56	18	40	42	0	81	0
160	2	24	4	20	6	14	9	36	14	48	21	20	48	0	92	0
180	2	42	4	58	6	56	10	48	16	36	24	0	54	0	104	0
200	3	0	5	36	7	36	12	0	18	25	26	40	60	0	116	0
225	3	22	6	18	8	33	13	30	20	45	30	0	67	30	130	0
250	3	45	7	0	9	30	15	0	23	0	33	20	75	0	144	0
275	4	7	7	42	10	27	16	30	25	20	36	40	82	30	159	0
300	4	30	8	24	11	24	18	0	27	40	40	0	90	0	174	0

[*See pages* 352, 353, 616, 664.

See pages 352, 353, 615, 664.

FORMULÆ.

THE WET COLLODION PROCESS.

Iodised Collodion (for Negatives).

Ether, s.g. ·725	10 fluid ounces.
Alcohol, s.g. ·805	8 ,,
Pyroxyline	120 grains.
Iodide of ammonium	12 ,,
,, cadmium	20 ,,

Bromo-Iodised Collodion (for Negatives).

Ether, s.g. ·725	10 fluid ounces.
Alcohol, s.g. ·805	10 ,,
Pyroxyline	120 grains.
Iodide of ammonium	40 ,,
,, cadmium	40 ,,
Bromide of ,,	20 ,,

Bromo-Iodised Collodion (for Positives or Ferrotypes).

Ether, s.g. ·725	10 fluid ounces.
Alcohol, s.g. ·805	10 ,,
Pyroxyline	100 grains.
Iodide of cadmium	50 ,,
Bromide of ammonium	20 ,,

The Nitrate Bath (for Negatives).

Nitrate of silver (recrystallised)	6 ounces.
Distilled water	80 fluid ounces.
Nitric acid (pure)	10 minims.

Saturate with iodide of silver and filter.

(For Positives or Ferrotypes).

Nitrate of silver (recrystallised)	5 ounces.
Distilled water	80 fluid ounces.
Nitric acid (pure)	12 minims.

Saturate with iodide of silver and filter.

DEVELOPER.

FOR NEGATIVES.

1.	Protosulphate of iron	¼ ounce.
	Glacial acetic acid	¼ "
	Alcohol	½ "
	Water	8 ounces.
2.	Ammonio-sulphate of iron	75 grains.
	Glacial acetic acid	75 "
	Sulphate of copper	7 "
	Water	3 ounces.

FOR COLLODION POSITIVES OR FERROTYPES.

Protosulphate of iron	1½ ounce.
Nitrate of baryta	1 "
Water	1 pint.
Alcohol	1 ounce.
Nitric acid	40 drops.

FOR COLLODION TRANSFERS.

Pyrogallic acid	5 grains.
Citric acid	3 "
Acetic acid	45 minims.
Water	1 ounce.
Alcohol	*quant. suff.*

PYROXYLINE FOR DRY COLLODION PROCESSES.

FOR COLLODIO-BROMIDE OR UNWASHED EMULSION.

Nitric acid, s.g. 1·45	2 fluid ounces.
Sulphuric acid, s.g. 1·845	4 "
Water	1 fluid ounce.
Cotton (cleaned and carded)	100 grains.
Temperature	150° Fahr.
Time of immersion	10 minutes.

FOR WASHED EMULSION.

1.	Nitric acid, s.g. 1·45	2 fluid ounces.
	Sulphuric acid, s.g. 1·845	6 ,,
	Water	1 fluid ounce.
	Cotton (cleaned and carded)	100 grains.
	Temperature	140° Fahr.
	Time of immersion	10 minutes.
2.	Nitric acid, s.g. 1·45	2 fluid ounces.
	Sulphuric acid, s.g. 1·845	3 ,,
	White blotting paper	145 grains.
	Temperature	100° Fahr.
	Time of immersion	30 minutes.

COLLODIO-BROMIDE EMULSION.

Ether, s.g. ·720	5 fluid ounces.
Alcohol, s.g. ·820	3 ,,
Pyroxyline	50 grains.
Bromide of cadmium and ammonium	80 ,,
or Bromide of zinc	76 ,,

Sensitise by adding to each ounce fifteen grains of nitrate of silver, dissolved in a few drops of water and one drachm of boiling alcohol. This is suitable for slow landscape work or for transparencies.

WASHED EMULSION (for Landscapes).

No. 1

Ether, s.g. ·720	4 fluid ounces.
Alcohol, s.g. ·820	2¾ ,,
Pyroxyline	40 grains.
Castile soap (dissolved in alcohol)	30 ,,
Bromide of ammonium and cadmium	84 ,,

Sensitise with one hundred grains of nitrate of silver dissolved in one ounce of boiling alcohol; and after standing ten days, add a further twenty grains of silver dissolved as before in two drachms of alcohol.

No. 2 (rapid).

Ether, s.g. ·720	4 fluid ounces.
Alcohol, s.g. ·820	2½ ,,
Pyroxyline	40 grains.
Castile soap	30 ,,
Bromide of ammonium and cadmium	56 ,,

Sensitise with 125 grains of nitrate of silver, dissolved, as before, in one ounce of alcohol with the aid of heat. In twelve hours' time add thirty grains more of the double bromide of ammonium and cadmium dissolved in half an ounce of alcohol.

For Washed Emulsion (for Transparencies).

Ether, s.g. 720	5 fluid ounces.
Alcohol, s.g. ·820	3 ,,
Pyroxyline or papyroxyline	60 grains.
Bromide of cadmium and ammonium	100 ,,
or Bromide of zinc	96 ,,
Hydrochloric acid, s.g. 1·2	8 minims.

Sensitise with twenty grains of nitrate of silver to each ounce, dissolved in a minimum of water with two drachms of boiling alcohol. Allow to stand for two or three days.

N.B.—In the three last formulæ, the emulsion, after being allowed to ripen for the time stated, should be poured into a dish and allowed to become thoroughly dry. The mass of dry emulsion is then washed, to remove all the soluble salts, and is then again dried and redissolved in equal parts of ether and alcohol, at the rate of from twenty to twenty-four grains to the ounce of solvents.

ORGANIFIERS (for Unwashed Emulsions).

For Landscape Work.

1. Tannin	½ ounce.
Gallic acid	60 grains.
Water	20 fluid ounces.
2. Tannin	300 grains.
Water	20 fluid ounces.

For Landscapes or Transparencies (warm brown tone).

3. Freshly-ground coffee	1 ounce.
Boiling water	1 pint.

For Transparencies (brownish-black tone).

4. Tannin	30 grains.
Pyrogallic acid	60 ,,
Water	20 fluid ounces.

DEVELOPING SOLUTIONS FOR COLLODION EMULSION.

SOLUTION A.

Pyrogallic acid	96 grains.
Alcohol	1 fluid ounce.

SOLUTION B.

Bromide of potassium	10 grains.
Water	1 fluid ounce.

SOLUTION C.

Liquor ammonia, s.g. ·880	1 fluid drachm.
Water	15 fluid drachms.

OR D.

Carbonate of ammonia	2 grains.
Water	1 fluid ounce.

For each drachm of developer take, for a normal exposure, five minims of A, one or two minims of B, and one or two minims of C, or, if D be used, add the above quantities of A, B, and C, to one drachm of D. When the details of the image are out, add double the quantities of B and C.

INTENSIFYING SOLUTIONS FOR COLLODION EMULSION.

Nitrate of silver	60 grains.
Citric acid	30 ,,
Nitric acid	30 minims.
Water	2 ounces.

To each drachm of a three-grain solution of pyrogallic acid add two or three minims of the above, and apply until sufficient density is attained.

TO RESTORE FADED NEGATIVES.

Mr. W. E. Debenham recommends the following solution for the purpose of restoring printing force to negatives which have faded after mercurial intensification:—

Schlippe's salt	10 grains.
Water	1 ounce.

Wet the film thoroughly by soaking in a dish of water, and immerse in the restoring solution until the desired effect is obtained.

TO REMOVE THE LAST TRACES OF HYPO FROM THE FILM.

Hydroxyl.

Peroxyde of hydrogen (twenty vols.)	1 drachm.
Water...	5 ounces.

After washing the negative well it is immersed for a couple of minutes in the solution and again rinsed in water, when the intensification with silver can be at once proceeded with.

Another.

Where peroxide of hydrogen is not obtainable the following may be used as a substitute, the solution containing that substance in combination with others :—

Barium dioxide	1 ounce.
Glacial acetic acid	1 ,,
Water...	4 ounces.

Reduce the barium dioxide to a fine powder and add it gradually to the acid and water, shaking until dissolved. A few minutes' immersion in this solution will effectually remove or destroy the last traces of hypo.

Alum.

A simple plan brought forward by Captain Abney for this specific purpose consists in employing a saturated solution of alum in place of the solution of hydroxyl or peroxide of hydrogen.

Eau de Javelle.

Dry chloride of lime (hypochlorite of lime)	2 ounces.
Carbonate of potash	4 ,,
Water...	40 ,,

Mix the chloride of lime with thirty ounces of the water; dissolve the carbonate of potash in the remainder. Mix, boil, and filter.

Labarraque's Solution.

Chloride of lime	2 ounces.
Carbonate of soda	4 ,,
Water...	40 ,,

Mix the chloride of lime with thirty ounces of the water, and dissolve the carbonate of soda in the remainder. Mix, boil, and filter.

CLEARING SOLUTIONS FOR GELATINE NEGATIVES.

Alum	2 ounces.
Citric acid	1 ounce.
Water	10 ounces.

Wash moderately after fixing, and immerse the negative in the above.

ANOTHER.

Saturated solution of alum	20 ounces.
Hydrochloric acid (commercial)	1 ounce.

Immerse the negative after fixing, having previously washed it for two or three minutes under the tap; wash well after removal from the alum and acid.

FERROUS CITRO-OXALATE DEVELOPER.

1. Potassium citrate	700 grains.
Potassium oxalate	200 ,,
Water	3½ ounces.
2. Ferrous sulphate	300 grains.
Water	3½ ounces.

Mix in equal parts.

FORMULÆ FOR NEGATIVE VARNISH.

1. Sandarac	4 ounces.
Alcohol	28 ,,
Oil of lavender	3 ,,
Chloroform	5 drachms.
2. White hard varnish	15 ounces.
Methylated alcohol	25 ,,

This will be found a good and cheap varnish if durability is not required, as it is easily rubbed up for retouching upon and easily cleaned off. Very suitable for enlarged negatives that are not to be retained.

Tough, hard, and durable:—

3. Shellac	1¼ ounce.
Mastic	¼ ,,
Oil of turpentine	¼ ,,
Sandarac	1¼ ,,
Venice turpentine	¼ ,,
Camphor	10 grains.
Alcohol	20 fluid ounces.

4.	Sandarac	90 ounces.
	Turpentine	36 ,,
	Oil of lavender	10 ,,
	Alcohol	500 ,,

This one may be rubbed down with powdered resin, and gives a splendid surface for retouching:—

5.	Sandarac	2 ounces.
	Seed lac	1 to 1½ ounce.
	Castor oil	3 drachms.
	Oil of lavender	1½ drachm.
	Alcohol	18 fluid ounces.
6.	Best orange shellac	1½ ounce.
	Methylated alcohol	1 pint.

Keep in a warm place until dissolved; then add a large teaspoonful of whiting or prepared chalk; set aside to clear, and then decant. This is specially recommended for gelatine negatives.

Negative Retouching Varnish.

Sandarac	1 ounce.
Castor oil	80 grains.
Alcohol	6 ounces.

First dissolve the sandarac in the alcohol, and then add the oil.

Ground-Glass Varnish.

Sandarac	90 grains.
Mastic	20 ,,
Ether	2 ounces.
Benzole	½ to 1½ ounce.

The proportion of the benzole added determines the nature of the matt obtained.

PRINTING FORMULÆ.

SELECTED TONING FORMULÆ.

1.	Chloride of gold	1 grain.
	Acetate of soda	30 grains.
	Water	8 ounces.

This must not be used till one day after preparation. It keeps well, and gives warm, rich tones.

2.	Chloride of gold	1 grain.
	Bicarbonate of soda	4 grains.
	Water	8 ounces.

This is ready for immediate use after preparation, but it will not keep.

3.	Chloride of gold	1 grain.
	Phosphate of soda	20 grains.
	Water	8 ounces.

This gives rich tones of a deep purple nature, but must be used soon after preparation.

4.	Gold solution	10 drachms.
	Acetate of lime	20 grains.
	Chloride of lime	1 grain.
	Tepid water	20 ounces.

The 'gold solution' before mentioned is prepared by neutralising as much as is required of a one-grain solution of chloride of gold by shaking it up with a little prepared chalk, then allowing it to settle, and filtering off the clear liquid. This toning bath improves by keeping. To use, add two ounces of it to eight ounces of tepid water, which will prove sufficient to tone a full-sized sheet of paper.

5.	Chloride of gold	15 grains.
	Water	5 ounces.

Neutralise with lime water, make up to fifteen ounces with water, and add two drachms of chloride of calcium. This stock solution will keep for a long time for use. Dilute one ounce with ten ounces of water.

Toning and Fixing in One Bath.

6.	Chloride of gold	1 grain.
	Phosphate of soda	15 grains.
	Sulphocyanide of ammonium	25 ,,
	Hyposulphite of soda	240 ,,
	Water	2 ounces.

Dissolve the gold separately in a small quantity of water, and add it to the other solution.

MONCKHOVEN'S INTENSIFIER.

A. Bromide of potassium	10 grains.
Bichloride of mercury	10 ,,
Water	1 ounce.
B. Pure cyanide of potassium	10 grains.
Nitrate of silver	10 ,,
Water	1 ounce.

Place the negative in A till it is white, then rinse and transfer it to solution B. If the intensification has been carried too far, it may be reduced by treatment with a weak solution of hyposulphite of soda.

BARKER'S GELATINO-CHLORIDE FOR PRINTING-OUT.

Gelatine (Nelson's No. 1 and Coignet's, equal parts)	175 grains.
Chloride of ammonium	18 ,,
Rochelle salts	50 ,,
Nitrate of silver	75 ,,
Alcohol	4 drachms.
Water	5 ounces.

Heat to 100° Fahr., and allow to remain at this temperature after all is dissolved for ten minutes, after which proceed in the usual way.

TONING BATH FOR GELATINO-CHLORIDE EMULSION PAPER.

Wash the prints in clean water and then *tone* in the following:—

A. Distilled water	25 ounces.
Acetate of soda (recrystallised)	1 ounce.
Into which pour a solution of 1 per cent. of chloride of gold	2 ounces.

B. In ten ounces of distilled water, dissolve two drachms of sulpho-cyanide of ammonia, and add one ounce solution of 1 per cent. chloride of gold.

For toning, mix in the proportion of twenty ounces of A to six of B, if possible the evening before using.

SOLUTION FOR MOUNTING PRINTS WITHOUT THEIR COCKLING.

Nelson's No. 1 photographic gelatine	4 ounces.
Water	16 ,,
Glycerine	1 ounce.
Methylated alcohol	5 ounces.

Dissolve the gelatine in the water, then add the glycerine, and lastly the spirit.

ENCAUSTIC PASTE.

Pure wax	500 parts.
Gum elemi	10 ,,
Benzole	200 ,,
Essence of lavender	300 ,,
Oil of spike	15 ,,

SENSITISING SOLUTION FOR CARBON TISSUE.

Bichromate of potash	1 ounce.
Water	20 ounces.
Liquor ammonia	6 minims.

WAXING SOLUTION.

For Carbon Prints, or for Removing Collodion Films.

1. Beeswax	20 grains.
Benzole rect. No. 1	4 ounces.

For Flexible Supports (Autotype).

2. Yellow resin	3 drachms.
Yellow beeswax	1 drachm.
Rectified spirits of turpentine	10 ounces.

THE 'DUSTING-ON' PROCESS.

1. Saturated solution of bichromate of ammonia	5 drachms.
Honey	3 ,,
Albumen	3 ,,
Distilled water	20 to 30 ,,

2.	Dextrine	½ ounce.
	Grape sugar	½ ,,
	Bichromate	½ ,,
	Water	½ pint.
3.	Gum arabic	6 parts.
	Bichromate of potash	2·5 ,,
	Grape sugar	4 ,,
	Water	72 ,,
4.	Honey	4 drachms.
	Glucose	8 ,,
	Albumen	6 ,,
	Dextrine	3 ,,
	Bichromate of potash	8 ,,
	Water	20 ounces.

TONING BATH FOR GELATINO-CHLORIDE PRINTS.

A.	Water	3 ounces.
	Chloride of gold	2 grains.
B.	Water	3 ounces.
	Sulphocyanide of ammonium	40 grains.
	Hyposulphite of soda	1 grain.
	Carbonate of soda	3 grains.[1]

These are mixed together by one part of A being poured into an equal part of B; in no case the reverse.

DEVELOPERS.

FOR PAPER NEGATIVES.

1.	Sodic sulphite, *pure*	8 ounces.
	Hot distilled water	40 ,, (fluid).

Let cool to 60° Fahr., and render *just* acid with citric. Test with litmus. Pour on to 1 ounce (437½ grains) pyro.

2.	Sodic carbonate, *pure*	4 ounces.
	Potassic „ „	1 ounce.
	Distilled water	40 ounces (fluid).

Mix equal parts No. 1 and No. 2 for normal exposures.

Always have a ten per cent. solution of bromide at hand for emergencies, and use if great opacity is desired, but as a rule no restrainer is necessary.

It is sometimes desirable to proceed with caution, and add a portion only of the No. 2 solution at the outset, and when time is not of much importance it is better further to dilute the mixed developer with one-third to one-half its bulk of water. Push the development further than seems necessary.

BOELTE'S DEVELOPER.

A.	Distilled boiling water	500 parts.
	Sulphite soda	100 „
	Citric acid	8 „
	Pyro	15 „
B.	Distilled boiling water	500 parts.
	Carbonate soda	25 „
	Carbonate potash	25 „

To develop, take of A, one part; B, one part; water, one part.

STANDARD DEVELOPER OF NEW YORK AMATEUR SOCIETY.

A.	Water	32 ounces.
	Yellow prussiate of potash	3 „
	Carbonate of soda	3 „
	Carbonate of potash	3 „
B.	Water	32 ounces.
	Sulphite of soda	3 „

To one and three-quarter ounces of B add a quarter of an ounce of A and four grains of dry pyro.

EDER'S OXALATE DEVELOPER.

Neutral oxalate of potash	2 ounces.
Sulphate of iron	6 drachms.
Water	3½ ounces.

Neutral oxalate of potash is dissolved in boiling water, and this solution is kept at a temperature between 194° and 203° Fahr., while sulphate of iron is dissolved in it. It is then set aside for twenty-four hours, and the clear liquid decanted off the crystals that have formed at the bottom, and is ready for use.

BEACH'S DEVELOPER.

No. 1.—Pyro Solution.

Sulphite soda (chem. pure crystals)	4 ounces.
Warm distilled or melted ice water	4 ,,

When cooled to 70° Fahr., add—

Sulphurous acid water (strongest to be had)	3½ ounces.

And, lastly,—

Pyrogallol	1 ounce.

No. 2.—Potash Solution.

A. Carbonate potash (chem. pure)	3 ounces.
Water	4 ,,
B. Sulphite soda (chem. pure crystals)	2 ounces.
Water	4 ,,

Mix A and B separately, and then combine in one solution.

To make two ounces of developer, pour into the graduate one drachm of No. 1 (equivalent in all to six grains of pyro) and twenty minims or a quarter of a drachm No. 2, then fill the graduate to two ounces with water. If after two or three minutes no trace of the image appears in the brilliant high lights, add to the graduate twenty minims more of the potash solution, mix with the developer, and return to the plate. Do not exceed two and a half drachms of the alkaline solution.

TRANSPARENCIES ON GELATINO-CHLORIDE PLATES (EDWARDS'S).

Solution A.

Neutral oxalate of potash	2 ounces.
Chloride of ammonium	40 grains.
Distilled water	20 ounces.

Solution B.

Sulphate of iron	4 drachms.
Citric acid	2 ,,
Alum	2 ,,
Distilled water	16 ounces.

For black tones mix the above in equal volumes.

HYDROQUINONE DEVELOPERS.

From various reliable sources.

No. 1.

For a single stock solution prepare as follows :—

A.	Hydroquinone (granular)	50 grains.
	Meta-bisulphite of potash	80 ,,
	Water	4 ounces.
B.	Carbonate of potash	840 grains.
	Water	4 ounces.

Filter solution B, and then mix A and B.

For use, take half an ounce of this solution and add to five ounces of water. The picture takes perhaps rather longer to appear, but gradually and evenly works up to the required density. If the plate should prove to have been over exposed, add a little water to the developer, but avoid the use of bromides. Some may prefer to keep the solutions separate, when they would keep indefinitely; in this event prepare as follows :—

No. 2.

A.	Hydroquinone (granular)	15 grains.
	Meta-bisulphite of potash	20 ,,
	Water	1 ounce.
B.	Carbonate of potash	180 grains.
	Water	20 ounces.

For use add two drachms of A to five ounces of B. Plates can be developed in the same solution one after another, even after it has attained the colour of light port wine.

No. 3.

Bitartrate of potash	90 grains.
Sulphite of potash	45 ,,
Carbonate of potash	4 ounces.
Water	16 ,,

Filter, and add

Hydroquinone	½ ounce.

For use, one part is diluted with sixteen parts water.

No. 4.

Carbonate of soda	4½ ounces.
Sulphite of soda	2½ ,,
Hydroquinone	150 grains.
Water	36 ounces.

When freshly prepared the bath is too strong, and should have a third of water added to it; afterwards each time of using a certain quantity of new solution should be added. The solution is not filtered, the clear part is decanted off.

No. 5.

Citric acid	5 grains.
Bromide of potassium	10 ,,
Hydroquinone	60 ,,
Sulphite of soda	120 ,,
Water	10 ounces.

Grind the hydroquinone in a mortar with warm water, then add the rest, and pass it on to the boy to be shaken till thoroughly dissolved; either filter, or allow to stand till clear. The alkali to be either caustic soda (four to six grains per ounce) or common crystals of soda (forty or fifty grains per ounce), or any chosen mixture of the two. Equal quantities of each for developing.

No. 6.

A. Sulphite of soda	2½ ounces.
Boiled water	16 ,,
B. Crystal carbonate of soda	¼ pound.
Water (boiled)	20 ounces.
C. Hydroquinone	1 drachm.
Rectified spirits of wine	2½ ounces.

Take half an ounce each of A and B, and add half a drachm of C. If over exposure occurs add to this quantity, say, two or three drops of

Bromide of ammonium	200 grains.
Water	2 ounces.

No. 7.

For Chloride Plates.

Hydroquinone	2 grains.
Sulphite of soda	10 grains.
Carbonate of ammonia (or pot.)	10 ,,
Bromide of potassium	$\frac{1}{10}$ grain.
Water	1 ounce.

No. 8.

A. Hydroquinone	120 grains.
Sulphite of soda	1 ounce.
Bromide of potassium	25 grains.
Water	15 ounces.
B. Dry powdered pure carbonate of potash	2 ounces.
Dry powdered pure carbonate of soda	2 ,,
Water to make up to	20 ,,

A and B are mixed in equal parts for development, and the picture is brought out in about three minutes when ordinary bromide plates are used.

A NEW DEVELOPING AGENT.

In the pages of *La Nature* a description is given of the discovery of the use of pyrocatechine as a developer, M. Benoist, Professor of Physics at the Lyceum of Toulouse, being the investigator to whom the credit is due. He was struck with the idea that as hydroquinone was so useful as a developer, its isomer, the above-named chemical, might be equally valuable, and upon trying it he found it to be a developer of the same class, but possessing certain advantages of its own—'purity and harmony' in the negatives being greater than with hydroquinone. He states that it may be kept in the open air for a longer time without discolouration, precipitation, or sensible diminution of its power. In corked bottles it may be preserved for an indefinite time. Its greatest drawback is its high price—one and a half franc per gramme; but this he thinks would certainly be reduced if there were any demand for it, as it is comparatively easy to manufacture.

With reference to the present high price of pyrocatechine, the Editor of this Almanac remembers when he had to pay seven shillings *per drachm* of pyrogallic acid. Compare this with its present price. So with the past and present price of hyposulphite of soda. An increased demand for any chemical soon causes a reduction in its price.

DEVELOPING FORMULÆ.

COMPILED BY MESSRS. LYONEL CLARK AND E. FERRERO.

The Quantities are given in Grains and Minims per Ounce of Developer.

PLATES.	Pyro.	Ammonium Bromide.	Potassium Bromide.	Ammonia.	Sodium Carbonate.	Potassium Carbonate.	Ammonium Carbonate.	Sodium Sulphite.	Potassium meta-bisulphite.
	Grains.	Grains.	Grains.	Minims.	Grains.	Grains.	Grains.	Grains.	
Abney and Derby ...	2	2 to 4	...	1·60 to 4	...	...	...	...	...
Ditto	3·60	...	...	...	...	22	...	18·80	...
Academy	2	2	...	4	...	...	...	...	...
Albert	1·50	0·63	...	3·16	...	...	...	...	...
Beechey (Dry Col.)	12	...	3	...	...	...	30	...	...
Beernaert	4·78	...	...	...	16·05	...	...	32·10	...
Britannia	2	2	...	4	...	...	...	...	...
Cadett's	1·50	3	...	6	...	...	...	...	...
Charterhouse ...	1·36	3·40	...	1·36	...	...	...	2·72	...
Cranbourne ...	1·10	...	0·72	2·30	...	...	...	4·40	...
Derby...	2	2 to 4	...	1·60 to 4·00	...	...	...	...	...
Derwent	2·18	...	...	...	14·4	...	...	38·4	...
Eastman's Pap. Neg.	4·50	...	...	...	19	...	...	27	...
Eastman's Strip. Flm.	4·50	...	...	...	19	...	...	27	...
Do. Do.	3·53	...	...	...	12	3	...	21·18	...
Do. Do. (NH_3)	2	0·50	...	3	...	...	...	...	2
Edwards's XL ...	2·10	0·50	...	2	...	...	...	...	...
England's	1·50	...	1	2	...	...	...	...	...
Ditto, Instantaneous	3·40	...	...	...	...	8·60	...	17	...
Elliott and Fry's ...	2	0·30	...	1 to 1·30	...	...	...	...	...
Elliott's	3	1	...	3	...	...	...	...	...
Ditto, Extra Special	2	1	...	3	...	...	...	...	...
Ditto, Dragon ...	2	2·80	...	3·75	...	...	...	...	...
Facilis	2	2·50	...	4·50	...	...	...	...	...
Froedman's Tissue	3·33	...	...	...	...	8·75	...	22	...
Fry's German (Dr. Eder's)	2	...	0·57	2	...	...	...	...	...
Do. Kingston, Specl. / Do. Do. Instantan.	2	0·71	...	2	...	...	...	...	...
German (Sands and Hunter)	2·14	...	0·23	1·87	...	...	...	...	...

Globe	2	1	...	4	...	...	...	...	...
Ilford	1·85	2·50	...	4·50	...	...	...	...	...
Keystone	2·50	...	...	...	...	6·41	...	10	...
Lancaster's	2·40	...	0·83	5	...	...	...	...	...
Ludgate	2·14	...	0·23	1·87	...	...	...	...	...
Manchester, No. 1	2	Bromide to	Ammonia	as 1 is to 4	...	...	...	...	..
Do. No. 2	2	1·50	0·75	3	...	...	...	6	...
Do. No. 3 Sulp.-Pyro	2	0·90	0·46	1·80	...	...	...	...	...
Do. No. 4 do. (Potash)	2	...	0·12	...	...	4	...	...	...
Do. No. 5 do. (Soda)	2	...	0·12	...	4	...	...	...	...
Mawson and Swan's	1·50	0·75	...	3·75	...	...	...	...	1·50
Do., New Cheap	1·50	1·50	...	3·75	...	...	...	...	...
Do. (Soda)	1	...	0·50	...	14	...	...	21	...
Do., Photo-Mechanical and Lantern ...	1·50	0·75	...	3	...	...	...	...	1·50
Mawdsley	1·50	...	0·50	3	...	...	...	...	...
Mayfield's Spcl. Fav.	3·40 to 5·10	...	...	...	...	12 to 30	...	21·60 to 40·40	...
Miall's	3	0·25 to 0·50	...	2·50 to 4	...	...	...	...	...
Midland	2	0·20 to 0·40	...	0·60 to 4	...	...	...	...	...
Monckhoven's ...	1·25	1·50	...	2 to 4	...	...	...	...	...
Morgan and Kidd's	2	0·25	...	1	...	...	...	...	...
Do. Richmond ...	2 or more	0·20 or more	...	0·83 or more	...	...	...	...	...
National	2·50	...	1·50	2·30	...	...	...	...	...
Nelson	2	2·90	...	11·33	...	...	...	...	...
Obernetter	0·80	...	0·20 to 0·50	...	7 to 10	...	...	40	...
Paget's	1·82	0·45	...	2·50	...	...	...	7·29	...
Premier	2	2·50	...	3	...	...	...	...	...
Rouch's	1·26	1·26	...	3	...	...	...	5·04	...
Soho	1·90	1·25	...	2·25	...	...	...	...	...
Thomas's	1·08	1·08	...	2·40	...	...	...	4·32	...
Do. (Potash) ...	2·25	0·11	...	...	...	9·37	...	6·75	...
Trafalgar	1	...	1	1·30	...	...	...	...	...
Vogel (Obernetter) Azaline Plates ...	1	...	...	...	7·50 to 11·25	...	...	50	...
Wratten and Wainwright's Ordinary	2	...	0·33	250	...	...	...	...	...
Wratten and Wainwright's Instant.	3	...	0·33	250	...	...	...	...	...
Wratten and Wainwright's Special Drop-Shutter ...	3	...	0·62	250	...	...	...	...	...
Wratten and Wainwright's (Soda)	3	...	...	...	18	...	...	18	...

SOLUTIONS FOR SILVERING GLASS MIRRORS.

(In employing the following formulæ, it should be well understood that the glass plate to be silvered must be scrupulously clean.)

Martin's.

A.

Nitrate of silver	175 grains.
Distilled water	10 ounces.

B.

Nitrate of ammonia	262 grains.
Distilled water	10 ounces.

C.

Pure caustic potash	1 ounce (avoirdupois).
Distilled water	10 ounces.

D.

Pure sugar candy	½ ounce (avoirdupois).
Distilled water	5 ounces.

Dissolve and add—

Tartaric acid	50 grains.

Boil in a flask for ten minutes, and when cool add—

Alcohol	1 ounce.

Distilled water *quant. suff.* to make up to 10 ounces.

For use take equal parts of A and B. Mix together also equal parts of C and D, and mix in another measure. Then mix both these mixtures together in the silvering vessel, and suspend the mirror face downward in the solution.

H. J. Burton's.

Solution 1.

Nitrate of silver	25 grains.
Distilled water	1 ounce.

Solution 2.

Potash (pure)	25 grains.
Distilled water	1 ounce.

Solution A.

Solution 1 } Solution 2 }	equal parts.
Ammonia	to just dissolve the precipitate.
Solution 1	to just cause a discolouration.

Solution B.

Loaf sugar	2700 grains.
Distilled water	20 ounces.
Nitric acid	2 drachms.
Alcohol (strong)	10 ounces.
Distilled water to make	80 ,,

For use—

Solution A	1 ounce.
Solution B	1 drachm.

Solution A is subject to slow decomposition; Solution B, on the contrary, improves by keeping.

CHROMOGRAPH MIXTURES.

Make a zinc tray about a quarter of an inch in depth, and pour into it a warm solution made as follows:—

Water	4 ounces.
Sulphate of baryta	2½ ,,
Sugar	1 ounce.
Gelatine	1 ,,
Glycerine	6 ounces.

INK STAINS ON PRINTS OR BOOKS.

These may, in the majority of cases, be removed by applying a solution of muriatic acid, oxalic acid, or salt of sorrel (binoxalate of potash). After the stains disappear wash very thoroughly in water, and dry.

Write whatever is required to be printed upon a sheet of white paper, using instead of ordinary ink the aniline colour known as 'violet of methylaniline;' as soon as the writing is pretty dry, lay it upon the gelatine surface and rub the back of the paper with the palm of the hand. The ink will be absorbed by the gelatinous product. All that is to be done in order to obtain a *facsimile* of the writing is to lay a sheet of paper upon the writing on the gelatine and rub the back with the hand. From forty to fifty can thus be drawn off in a few minutes.

INK FOR RUBBER STAMPS.

Aniline red (violet)	90 grains.
Boiling distilled water	1 ounce.
Glycerine	half a teaspoonful.
Treacle	half as much as glycerine.

INTENSIFYING NEGATIVES.

A.

Bichloride of mercury	1 ounce.
Chloride of ammonia	1 ,,
Potassic iodide	1 ,,

Dissolve the mercury and ammonia salts in ten ounces of water, putting them both in together, and add sufficient of the strong iodide of potash solution; shake well, and make up to twenty ounces with water.

B.

Silver nitrate	$\frac{1}{2}$ ounce.
Potassium cyanide, sufficient to dissolve out the first precipitate.	

Now make up this bulk to twenty ounces with water.

This solution should not be used at full strength when little density is required, but diluted to half. The fixed and well-washed negatives should be placed in a dish containing the A solution, and gently kept in motion for a few seconds. Examine from time to time until it appears quite dense, take out and well wash again until the film is an even yellow all over, then place in a dish containing the B solution, and let remain until the film becomes a beautiful olive-brown, then lift out and set aside to dry.

TO CLEAR NEGATIVES.

Negatives which, after development by ferrous oxalate, are opalescent from oxalate of lime, are immersed in the following solution :—

Water	100 parts.
Oxalate of iron	2 ,,
Alum	8 ,,

By which the opalescence will be completely cleared, and the whites of the negative will remain transparent.

A BRILLIANT BLACK VARNISH

For iron, stone, or wood, can be made by thoroughly incorporating ivory black with common shellac varnish. The mixture should be laid on very thin. But ordinary coal-tar varnish will serve the same purpose in most cases quite as well, and it is not nearly so expensive.

TO REMOVE SILVER STAINS FROM GELATINE NEGATIVES.

Remove the varnish and apply the following :—

A.	Sulphocyanide of ammonia	½ drachm.
	Water	1 ounce.
B.	Nitric acid	½ drachm.
	Water	1 ounce.

A freshly-mixed solution being used for each negative. This is followed, after washing, by the application of a saturated solution of chrome alum.

TO PHOTOGRAPH ON SILK.

Immerse the silk in—

Water	1 ounce.
Gelatine	5 grains.
Chloride of sodium	5 ,,

Hang it up to dry; then float for half a minute on a fifty-grain solution of nitrate of silver; dry, print, tone, and fix, as usual.

INLAND PARCELS POST.

Every Post Office is open to the public for Parcels Post business on Week Days during the same hours as for general postal business. On Sundays Parcels Post business is not transacted.

Rates of Postage and Weight.—Three halfpence for each pound after the first, which is threepence.

Prepayment of Postage.—All parcels must be prepaid. Limitation of Weight.—No Parcel exceeding 11 lbs. in weight can be received for transmission by Parcels Post. Limitation of Size.—No Parcel may exceed 3 ft. 6 in. in length, or 6 ft. in length and girth combined. Posting of Parcels.—Parcels must be handed in at a Post Office Counter, and must not be dropped into a Letter Box.

RATES OF POSTAGE FOR INLAND LETTERS.

The rates of postage to be prepaid are as follow, viz.:—

For a letter not exceeding 1 oz.							1*d.*
,,	exceeding	1 oz.,	but not exceeding		2	ozs.	$1\frac{1}{2}d.$
,,	,,	2	,,	,,	4	,,	2*d.*
,,	,,	4	,,	,,	6	,,	$2\frac{1}{2}d.$
,,	,,	6	,,	,,	8	,,	3*d.*
,,	,,	8	,,	,,	10	,,	$3\frac{1}{2}d.$
,,	,,	10	,,	,,	12	,,	4*d.*
,,	,,	12	,,	,,	14	,,	$4\frac{1}{2}d.$

And so on at the rate of $\frac{1}{2}d.$ for every additional two ounces.

TABLES, ETC., SEE PP. **609-14, 643-49.**

See pages 671, 672, 673.

TABLE OF THE SYMBOLS, ATOMICITY, ATOMIC, AND EQUIVALENT WEIGHTS OF THE ELEMENTS.

NAME.	Symbol and Atomicity.	Atomic Weight.	Equivalent Weight.
Aluminium	Al^{iii}	27·4	9·13
Antimony (Stibium)	Sb^{iii}	122·0	40·66
Arsenic	As^{iii}	75·0	25·0
Barium	Ba^{ii}	137·0	68·5
Bismuth	Bi^{iii}	208·0	69·33
Boron	B^{iii}	11·0	3·66
Bromine	Br^{i}	80·0	80·0
Cadmium	Cd^{ii}	112·0	56·0
Cæsium	Cs^{i}	133·0	133·0
Calcium	Ca^{ii}	40·0	20·0
Carbon	C^{iv}	12·0	3·0
Cerium	Ce^{ii}	92·0	46·0
Chlorine	Cl^{i}	35·5	35·5
Chromium	Cr^{ii}	52·2	26·1
Cobalt	Co^{ii}	58·8	29·4
Columbium (or Niobium)	Cb^{v}	94·0	18·8
Copper (Cuprum) — Cuprosum	Cu^{i}	63·4	63·4
Copper (Cuprum) — Cupricum	Cu^{ii}	63·4	31·7
Davyum	Da	...	...
Didymium	Di^{ii}	95·0	47·5
Erbium	E^{ii}	112·6	56·3
Fluorine	Fl^{i}	19·0	19·0
Gallium	Ga	68·0	...
Glucinum	G^{ii}	9·4	4·7
Gold (Aurum)	Au^{iii}	196·0	65·33
Hydrogen	H^{i}	1·0	1·0
Indium	In^{iii}	113·4	37·8
Iodine	I^{i}	127·0	127·0
Iridium	Ir^{iv}	198·0	49·5
Iron (Ferrum) — Ferrosum	Fe^{ii}	56·0	28·0
Iron (Ferrum) — Ferricum	Fe^{iii}	56·0	18·66
Lanthanum	La^{ii}	92·8	46·4
Lead (Plumbum)	Pb^{ii}	207·0	103·5
Lithium	Li^{i}	7·0	7·0
Magnesium	Mg^{ii}	24·0	12·0
Manganese	Mn^{ii}	55·0	27·5
Mercury (Hydrargyrum) — Mercurosum	Hg	200·0	200·0
Mercury (Hydrargyrum) — Mercuricum	Hg^{ii}	200·0	100·0
Molybdenum	Mo^{ii}	92·0	46·0
Nickel	Ni^{ii}	58·8	29·4
Nitrogen	N^{iii}	14·0	4·66
Osmium	Os^{iv}	199·0	49·75
Oxygen	O^{ii}	16·0	8·0
Palladium	Pd^{ii}	106·5	53·25

TABLE OF SYMBOLS, &c.—Continued.

Name.		Symbol and Atomicity.	Atomic Weight.	Equivalent Weight.
Phosphorous		P^{iii}	31·0	10·33
Platinum	Platinosum	Pt^{ii}	197·4	98·7
	Platinicum	Pt^{iv}	197·4	49·35
Potassium (Kalium)		K	39·1	39·1
Rhodium		Rh^{ii}	104·4	52·2
Rubidium		Rb^{i}	85·4	85·4
Ruthenium		Ru^{iv}	104·0	26·0
Selenium		Se^{ii}	79·4	39·7
Silicium (or Silicon)		Si^{iv}	28·0	7·0
Silver (Argentum)		Ag^{i}	108·0	108·0
Sodium (Natrium)		Na^{i}	23·0	23·0
Strontium		Sr^{ii}	87·5	43·75
Sulphur		S^{ii}	32·0	16·0
Tantalum		Ta^{v}	182·0	36·4
Tellurium		Te^{ii}	128·0	64·0
Thallium		Te^{i}	204·0	204·0
Thorium (or Thorinum)		Th^{iv}	231·5	57·87
Tin (Stannum)	Stannosum	Sn^{ii}	118·0	59·0
	Stannicum	Sn^{iv}	118·0	29·5
Titanium		Ti^{iv}	50·0	12·5
Tungsten (Wolfram)		W^{iv}	184·0	46·0
Uranium		Ur^{ii}	120·0	60·0
Vanadium		V^{iii}	51·3	17·1
Yttrium		Y^{ii}	61·7	30·85
Zinc		Zn^{ii}	65·2	32·6
Zirconium		Zr^{iv}	89·6	22·4

FREEZING MIXTURES.

The following mixtures will be found useful where ice is not readily obtainable—

	Ingredients.	Parts by Weight.	Temperature Produced Starting at 10°C.	Diminution of Temperature.
1	Water	1	16°C.	26°C.
	Nitrate of ammonia	1		
2	Water	16	12°	22°
	Saltpetre	5		
	Chloride of ammonium (sal ammoniac)	5		
3	Water	1	19°	29°
	Nitrate of ammonia	1		
	Carbonate of soda	1		
4	Snow	5	..	20°
	Chloride of sodium	2	..	
5	Snow	1	..	45°
	Crystallised chloride of calcium	2	..	
6	Crystallised sulphate of soda	8	20°	30°
	Hydrochloric acid	5		

TABLE OF SYMBOLS OF THE MORE IMPORTANT COMPOUNDS USED IN PHOTOGRAPHY.

Name.	Symbol.	
Acid, Acetic (Cryst.)	$H, C_2 H_3 O_2$	60
,, Citric	$H_3, C_6 H_5 O_7 + H_2 O$	210
,, Formic	H, CHO_2	46
,, Gallic	$H, C_7 H_5 O_5$	170
,, Hydriodic	HI	128
,, Hydrobromic	$H Br$	81
,, Hydrochloric	$H Cl$	36·5
,, Hydrocyanic	$H CN$	27
,, Hydrosulphuric	$H_2 S$	34
,, Nitric	H, NO_3	63
,, Oxalic	$H_2 C_2 O_4 + 2 H_2 O$	126
,, Pyrogallic	$H_3 C_6 H_3 O_3$	126
,, Sulphuric	$H_2 SO_4$	98
,, Sulphurous	$H_2 SO_3$	82
,, Tannic	$H_4 C_{27} H_{18} O_{17}$	618
,, Tartaric	$H_4 C_4 H_2 O_6$	150
Alum, Chrome	$Cr K (SO_4)_2 12 H_2 O$	499·3
,, (Potash)	$Al K (SO_4)_2 12 H_2 O$	474·5
Ammonium, Bromide	$NH_4 Br$	98
,, Carbonate	$(NH_4)_2 CO_3$	96
,, Chloride	$NH_4 Cl$	53·5
,, Iodide	$NH_4 I$	145
,, Nitrate	NH_4, NO_3	80
,, Sulphydrate of	NH_4, HS	51
,, Sulphocyanide of	NH_4, CNS	76
Barium, Bromide	$Ba Br_2$	297
,, Chloride (Cryst.)	$Ba, Cl_2 + 2 H_2 O$	244
,, Iodide	$Ba I_2$	391
,, Nitrate	$Ba, (NO_3)_2$	261
Cadmium, Bromide (Cryst.)	$Cd, Br_2 + 4 H_2 O$	344
,, Chloride	$Cd Cl_2$	183
,, Iodide	$Cd I_2$	366
Calcium, Bromide (Cryst.)	$Ca Br_2 + 4 H_2 O$	272
,, Chloride	$Ca Cl_2$	111
,, Iodide	$Ca I_2$	294
Copper, Bromide (cupric)	$Cu Br_2$	223·4
,, Chloride ,,	$Cu Cl_2 2 H_2 O$	170·4
,, Sulphate ,,	$Cu SO_4 5 H_2 O$	249·4
Gold, Terchloride	$Au Cl_3$	302·5
Iron, Chloride (ferrous)	$Fe Cl_2$	127
,, ,, (ferric)	$Fe_2 Cl_6$	325
,, Iodide	$Fe I_2$	310
,, Oxalate (ferrous)	$Fe C_2 O_4$	144
,, ,, (ferric)	$Fe_2 (C_2 O_4)_3$	376
,, Sulphate (ferrous)	$Fe SO_4 + 7 H_2 O$	278
,, ,, (ferric)	$Fe_2 (SO_4)_3$	400
,, Ammonia-sulphate	$Fe SO_4, (NH_4)_2 SO_4 + 6 H_2 O$	392
Lead, Acetate (Cryst.)	$Pb, (C_2 H_3 O_2)_2 + H_2 O$	343

TABLES OF SYMBOLS, &c.—CONTINUED.

NAME.	SYMBOL.	
Lead, Nitrate	Pb, $(NO_3)_2$	331
Lithium, Bromide	Li Br	87
,, Chloride	Li Cl	42·5
,, Iodide	Li I	134
Magnesium, Bromide	Mg Br_2	184
,, Chloride	Mg Cl_2	95
,, Iodide	Mg I_2	278
Mercury, Chloride (Mercuric)	Hg Cl_2	271
Platinum, Chloride	Pt Cl_4	339·4
Potassium, Bichromate	K_2 Cr_2 O_7	294·6
,, Bromide	K Br	119·1
,, Carbonate	K_2 CO_3	138·2
,, Chloride	K Cl	74·6
,, Citrate	K_3 C_6 H_5 O_7+H_2 O	324·3
,, Cyanide	K C N	65·1
,, Ferridcyanide	K_6 Fe_2 Cy_{12}	658·6
,, Ferrocyanide	K_4 Fe Cy_6	368·4
,, Hydrate	K OH	56·1
,, Iodide	K I	166·1
,, Nitrate	K NO_3	101·1
,, Permanganate	K_2 Mn_2 O_8	316·2
Silver, Acetate	Ag C_2 H_3 O_2	167
,, Bromide	Ag Br	188
,, Carbonate	Ag_2 CO_3	276
,, Chloride	Ag Cl	143·5
,, Citrate	Ag_3 $C_6H_5O_7$	513
,, Fluoride	Ag Fl	127
,, Iodide	Ag I	235
,, Nitrate	Ag NO_3	170
,, Oxalate	Ag_2 C_2 O_4	304
,, Oxide	Ag_2 O	232
,, Sulphide	Ag_2 S	248
Sodium, Acetate (Cryst.)	Na C_2 H_3 O_2 3 H_2 O	136
,, Biborate (Borax)	Na_2 B_4 O_7+10 H_2 O	382
,, Bromide	Na Br	103
,, Carbonate (Cryst.)	Na_2 CO_3+10 H_2 O	286
,, Chloride	Na Cl	58·5
,, Citrate	2 (Na_3 C_6 H_5 O_7) 11 H_2 O	714
,, Hyposulphite (Cryst.)	Na_2 S_2 O_3+5 H_2 O	248
,, Iodide	Na I	150
,, Sulphite	Na_2 SO_3 7 H_2 O	252
Strontium, Bromide	Sr Br_2	247·5
,, Chloride	Sr Cl_2	158·5
,, Iodide	Sr I_2	341·5
Uranium, Bromide	U Br_2 4 H_2 O	352
,, Nitrate	U_2 O_2 $(NO_3)_2$ 6 H_2 O	504
Zinc, Bromide	Zn Br_2	225·2
,, Chloride	Zn Cl_2	136·2
,, Iodide	Zn I_2	319·2

TABLE OF THE SOLUBILITIES OF THE PRINCIPAL SUBSTANCES USED IN PHOTOGRAPHY.

	One part is soluble in — parts of water. Cold.	Boiling.	100 parts of water dissolve at ordinary temperature.	Solubility in Alcohol.
Acid, Boracic (Anhydrous) .	47·01	...	2·13	soluble
,, ,, (Cryst.)	25·66	3·0	3·9	sol. in 6 parts @ 60°
,, Citric	0·75	0·5	133·0	sol. in 1·15 pt. s. g. 820
,, Gallic......................	100·0	3·0	1·0	soluble in 4 parts
,, Oxalic	15·5	1·0	6·47	insoluble
,, Pyrogallic	2·25	...	...	sol. in alc. and ether
,, Salicylic	87·2	vry sol	0·35	easily soluble
,, Succinic..................	5·0	2·2	20·0	soluble in 3 parts
,, Tannic	very	solubl	e	sol. in alc. and ether
,, Tartaric..................	·66	·5	150·0	soluble
Alum (Potash)	10·5	vry sol	9·52	insoluble
,, (Ammonia)	7·32	,,	13·66	,,
Ammonium, Bromide	1·4	0·78	41·1	sol. in 32·3 parts
,, Carbonate ...	3·3	·833	33·0	insoluble
,, Chloride	2·7	1·00	37·02	sparingly soluble
,, Citrate	deliqu	escent	vy. sol.	less sol. in alcohol
,, Iodide	very	solubl	e	soluble
,, Nitrate	2·0	1·0	50·0	freely soluble
,, Salicylate......	very	solubl	e	
,, Succinate	,,	,,		
,, Sulphocyanide	deliqu	escent	easily	sol. in water and alc.
Barium, Bromide	·96	...	104·2	easily soluble
,, Chloride { Crystallised	2·18	...	46·0	very slightly soluble
,, Chloride { Anhydrous.	2·862	...	34·1	
,, Iodide......................	0·48	0·35	208·3	easily soluble
,, Nitrate	12·2	2·84	8·18	
Cadmium, Bromide	easily	solubl	e	easily soluble
,, Chloride	0·71	0·67	...	,,
,, Iodide	1·08	0·75	92·6	very soluble
Calcium, Bromide (Cryst.) .	0·97	...	102·56	easily soluble
,, Chloride	0·25	any qy	400·0	
,, Iodide	deliqu	escent		
Cobalt, Chloride....	very	solubl	e	sol. in alc. and ether
Copper, Bromide (Cupric)...	deliqu	escent	vy. sol.	,, ,,
,, Chloride ,, ...	,,	,,	,,	,, ,,
,, Nitrate	solubl	e	...	very soluble
,, Sulphate	2·5	...	40·0	insoluble
Gold, Perchloride	deliqu	escent	vy. sol.	soluble in ether
Iron, Chloride { Anhyd. ...	2·0	...	50·0	sol. in 1 part alcohol
(Ferrous) { Hydrated .	0·68	...	147·0	easily soluble

TABLE OF THE SOLUBILITIES, &c.—Continued.

	One part is soluble in — parts of water.		100 parts of water dissolve at ordinary temperature.	Solubility in Alcohol.
	Cold.	Boiling.		
Iron, Chloride (Ferric)	very	del. &	sol.	very soluble
,, Oxalate ,, ...	insolu	ble, ex	cept in	excess of oxalic acid
,, Sulphate ,, ...	solubl	e	...	soluble
,, ,, (Ferrous) ...	1·3	·30	77·0	insoluble
Lead, Acetate	3·7	3·45	27·0	soluble in 12·5 parts
,, Nitrate	7·7	...	13·0	
Lithium, Bromide	0·66	...	149·8	soluble
,, Chloride	1·315	...	76·0	
,, Iodide	0·61	...	164·0	
Magnesium, Bromide	deliqu	escent	vy. sol.	very soluble
,, Chloride	1·857	...	53·8	
,, Iodide	deliqu	escent	vy. sol.	soluble
,, Sulphate	1·47	0·66	68·04	slightly soluble
Mercury, Chloride .... (Mercuric)	16·0	3·0	6·25	soluble in 2·35 parts
Platinum, Bichloride.........	solubl	e	...	easily sol. in alc. & ether
Potassium, Bichromate ...	10·0	...	10·0	
,, Bromide	1·55	...	64·5	
,, Carbonate	0·9	...	111·0	
,, Chloride	3·03	2·0	33·0	slightly soluble
,, Citrate	very	solubl	e	
,, Cyanide	deliqu	escent	vy. sol.	insol. in pure alcohol
,, Ferrocyanide ...	3·0	1·0	33·3	insoluble
,, Ferricyanide ...	2·54	1·22	39·37	very sparingly soluble
,, Hydrate	0·5	...	200·0	very soluble
,, Iodide	0·7	0·27	143·0	sol. in 40 pts. abs. alc.
,, Nitrate............	3·5	0·4	28·57	insoluble
,, Nitrite	deliqu	& solu	ble	
,, Oxalate(neutral)	3·0	...	33·3	slightly soluble
, ,, (bin.) ...	40·0	...	2·5	insoluble
,, ,, (quad.)..	20·17	...	4·95	insoluble
,, Permanganate..	16·0	...	6·25	insoluble
,, Sulphocyanide..				
Silver, Acetate	very	slightl	y sol.	
,, Citrate....................	solubl	e in wa	rm wate	r
,, Fluoride	deliqu	escent		
,, Nitrate	1·0	0·5	100·0	sol. in 4 pts. boiling alc.
,, Nitrite	300·0	dissol. easily	0·33	insoluble
,, Oxalate	spar'ly sol.	solubl	e	insoluble

TABLE OF THE SOLUBILITIES, &c.—Continued.

	One part is soluble in — parts of water. Cold.	Boiling.	100 parts of water dissolve at ordinary temperature.	Solubility in Alcohol.
Silver, Sulphate	200·0	88·0	0·5	insoluble
Sodium, Acetate (Cryst.)	2·86	·66	35·0	
,, Biborate (Borax)	12·44	2·0	8·033	insoluble
,, Bromide	1·13	...	88·5	
,, Carbonate (Cryst.)	2·0	1·0	50·0	insoluble
,, ,, (Anhyd.)	3·85	2·07	25·93	insoluble
,, Chloride	2·77	2·77	36·0	sparingly soluble
,, Citrate	1·0	...	100·0	sparingly soluble
,, Hydrate	1·65	...	60·63	easily soluble
,, Hyposulphite (Thiosulphate)	deliqu	escent	vy. sol.	insoluble
,, Iodide	0·55	0·3	180·0	sparingly soluble
,, Nitrate	1·136	...	88·03	sol. in 37 parts alc.
,, Nitrite	deliqu	escent	vy. sol.	very soluble
,, Phosphate	4·0	2·0	25·0	
,, Succinate	very s	oluble		
,, Sulphate	2·08	0·41	48·0	soluble
,, Sulphite	4·0	...	25·0	slightly soluble
,, Bisulphite	very s	oluble	...	insoluble
,, Sulphocyanide				
,, Tartrate	1·75	...	56·37	insoluble
,, Tungstate	4·0	2·0	25·0	
Strontium, Bromide	1·01	...	99·0	sparingly soluble
,, Chloride	1·88	...	53·0	feebly soluble
,, Iodide	0·56	0·27	178·5	
Uranium, Bromide (Hydrated)	deliqu	& solu	ble	soluble
,, Nitrate	0·5	...	200·0	sol. in alc. and ether
,, Oxalate	nearly insol.	30·0	...	insoluble
Zinc, Bromide	deliqu	escent	vy. sol.	very soluble
,, Chloride	0·333	...	300·0	very soluble
,, Iodide	vy. de	liques.	& sol.	very soluble

Percentage of Real Ammonia in Solutions of different Densities at 14° Centigrade.—Carius.

Specific Gravity.	Percentage Ammonia.	Specific Gravity.	Percentage Ammonia.	Specific Gravity.	Percentage Ammonia.	Specific Gravity.	Percentage Ammonia.
0·8844	36·0	0·9052	27·0	0·9314	18·0	0·9631	9·0
0·8864	35·0	0·9078	26·0	0·9347	17·0	0·9670	8·0
0·8885	34·0	0·9106	25·0	0·9380	16·0	0·9709	7·0
0·8907	33·0	0·9133	24·0	0·9414	15·0	0·9749	6·0
0·8929	32·0	0·9162	23·0	0·9449	14·0	0·9790	5·0
0·8953	31·0	0·9191	22·0	0·9484	13·0	0·9831	4·0
0·8976	30·0	0·9221	21·0	0·9520	12·0	0·9873	3·0
0·9001	29·0	0·9251	20·0	0·9556	11·0	0·9915	2·0
0·9026	28·0	0·9283	19·0	0·9593	10·0	0·9959	1·0

FRENCH FLUID MEASURES.

THE cubic centimètre, usually represented by 'c. c.,' is the unit of the French measurement for liquids. It contains nearly seventeen minims of water; in reality, it contains 16·896 minims. The weight of this quantity of water is one gramme. Hence it will be seen that the cubic centimètre and the gramme bear to each other the same relation as our drachm for solids and the drachm for fluids, or as the minim and the grain. The following table will prove to be sufficiently accurate for photographic purposes:—

1	cubic centimètre	=	17	minims (as near as possible).								
2	cubic centimètres	=	34	,,								
3	,,	=	51	,,								
4	,,	=	68	,,	or	1	drachm	8	minims.			
5	,,	=	85	,,	,,	1	,,	25	,,			
6	,,	=	102	,,	,,	1	,,	42	,,			
7	,,	=	119	,,	,,	1	,,	59	,,			
8	,,	=	136	,,	,,	2	drachms	16	,,			
9	,,	=	153	,,	,,	2	,,	33	,,			
10	,,	=	170	,,	,,	2	,,	50	,,			
20	,,	=	340	,,	,,	5	,,	40	,,			
30	,,	=	510	,,	,,	1	ounce	0	drachm	30	minims.	
40	,,	=	680	,,	,,	1	,,	3	drachms	20	,,	
50	,,	=	850	,,	,,	1	,,	6	,,	10	,,	
60	,,	=	1020	,,	,,	2	ounces	1	,,	0	,,	
70	,,	=	1190	,,	,,	2	,,	3	,,	50	,,	
80	,,	=	1360	,,	,,	2	,,	6	,,	40	,,	
90	,,	=	1530	,,	,,	3	,,	1	,,	30	,,	
100	,,	=	1700	,,	,,	3	,,	4	,,	20	,,	

THE CONVERSION OF FRENCH INTO ENGLISH WEIGHT.

ALTHOUGH a gramme is equal to 15·4346 grains, the decimal is one which can never be used by photographers; hence in the following table it is assumed to be $15\frac{2}{5}$ grains, which is the nearest approach that can be made to *practical* accuracy:

1	gramme	=	$15\frac{2}{5}$	grains.					
2	grammes	=	$30\frac{4}{5}$	,,					
3	,,	=	$46\frac{1}{5}$	,,					
4	,,	=	$61\frac{3}{5}$	,,	.... or	1	drachm	$1\frac{3}{5}$	grain.
5	,,	=	77	,,	.... ,,	1	,,	17	grains.
6	,,	=	$92\frac{2}{5}$	,,	.... ,,	1	,,	$32\frac{2}{5}$	,,
7	,,	=	$107\frac{4}{5}$	,,	.... ,,	1	,,	$47\frac{4}{5}$	,,
8	,,	=	$123\frac{1}{5}$	,,	.... ,,	2	drachms	$3\frac{1}{5}$	,,
9	,,	=	$138\frac{3}{5}$	,,	.... ,,	2	,,	$18\frac{3}{5}$	,,
10	,,	=	154	,,	.... ,,	2	,,	34	,,
11	,,	=	$169\frac{2}{5}$	,,	.... ,,	2	,,	$49\frac{2}{5}$	,,
12	,,	=	$184\frac{4}{5}$	,,	.... ,,	3	,,	$4\frac{4}{5}$	,,
13	,,	=	$200\frac{1}{5}$	,,	.... ,,	3	,,	$20\frac{1}{5}$	,,
14	,,	=	$215\frac{3}{5}$	,,	.... ,,	3	,,	$35\frac{3}{5}$	,,
15	,,	=	231	,,	.... ,,	3	,,	51	,,
16	,,	=	$246\frac{2}{5}$	,,	.... ,,	4	,,	$6\frac{2}{5}$	,,
17	,,	=	$261\frac{4}{5}$	,,	.... ,,	4	,,	$21\frac{4}{5}$	,,
18	,,	=	$277\frac{1}{5}$	,,	.... ,,	4	,,	$37\frac{1}{5}$	,,
19	,,	=	$292\frac{3}{5}$	,,	.... ,,	4	,,	$52\frac{3}{5}$	,,
20	,,	=	303	,,	.... ,,	5	,,	8	,,
30	,,	=	462	,,	.... ,,	7	,,	42	,,
40	,,	=	616	,,	.... ,,	10	,,	16	,,
50	,,	=	770	,,	.... ,,	12	,,	50	,,
60	,,	=	924	,,	.... ,,	15	,,	24	,,
70	,,	=	1078	,,	.... ,,	17	,,	58	,,
80	,,	=	1232	,,	.... ,,	20	,,	32	,,
90	,,	=	1386	,,	.... ,,	23	,,	6	,,
100	,,	=	1540	,,	.... ,,	25	,,	40	,,

APPLICATIONS FOR PATENTS CONNECTED WITH THE PHOTOGRAPHIC ART.

(*Corrected up to date of going to Press.*)

No. 15,827.—'An Improved Method of Heating Hollow Rollers for Photographic Rolling Presses, Rolling Machines, and the like.' W. E. Moss and J. Mitton.—*Dated November* 18, 1887.

No. 15,984.—'An Improved Method of, and Apparatus for, Coating Glass or other Surfaces for Photographic Purposes.' W. J. Cox.—*Dated November* 21, 1887.

No. 16,003.—'Improvements relating to Photo-chemical Printing.' Complete specification. W. Willis.—*Dated November* 21, 1887.

No. 16,018.—'Flexible Films for Photographic and other Purposes, and Apparatus in connexion with the Manufacture thereof.' J. E. Thornton. —*Dated November* 22, 1887.

No. 16,125.—'Improvements in Photo-engraving or Etching.' Complete specification. E. Albert.—*Dated November* 23, 1887.

No. 16,136.—'The Application of Photography to Automatic Sale and Delivery Machines, and the Utilisation of Automatic Sale and Delivery Machinery for the Production, Sale, and Delivery of Photographs.' E. J. Ball.—*Dated November* 23, 1887.

No. 16,241.—'Improvements in Apparatus for Coating Glass or other Surfaces with Fluid or Semi-fluid Substances for Photographic or other Purposes.' F. J. Vergara.—*Dated November* 25, 1887.

No. 16,576.—'Improvements in Photographic Roller Slides and Mechanism connected therewith.' J. E. Thornton.—*Dated December* 2, 1887.

No. 16,648.—'Improvements in Cameras.' V. W. Delves-Broughton.—*Dated December* 3, 1887.

No. 16,719.—'Improvements in the Application of Photography to Automatic Sale and Delivery Machines, and in the Utilisation of Automatic Sale and Delivery Machinery for the Production, Sale, and Delivery of Photographs.' E. J. Ball.—*Dated December* 5, 1887.

See Page 675.

Enlargements.

No. 16,987.—'Improvements in Apparatus for the Production of Oxygen and Nitrogen Gases from Atmospheric Air.' E. B. ELLICE-CLARK and L. CHAPMAN.—*Dated December* 9, 1887.

No. 17,296.—'A Registering Photographic Printing Frame' W. H. PRESTWICH.—*Dated December* 16, 1887.

No. 17,341.—'A Combined and Portable Automatic Apparatus capable of Exhibiting at Day or Night a Series of Views, Photographs, Pictures, or other Matters of Public Interest consecutively.' Communicated by V. Bonnet, H. Lissagaray, Armand Richard, and Alfred Richard. G. HUGHES. — *Dated December* 16, 1887.

No. 17,461.—'Improvements in the Modes of and Means or Apparatus for Taking and Producing Photographs and in Appliances connected therewith.' J. HINES, E. HOWELL, and A. HOWELL.—*Dated December* 19, 1887.

No. 17,634.—'A Process for Producing Engravings in Relief.' C. CHÉDIAC. —*Dated December* 22, 1887.

No. 17,693.—'Improvements relating to Means for Fixing and Clearing Photographic Pictures or Images.' Complete specification. H. B. BERKELEY. —*Dated December* 23, 1887.

No. 259.—'Explosives and Apparatus connected therewith for Producing Instantaneous Light for Photographing.' W. F. STANLEY.—*Dated January* 6, 1888.

No. 353.—'Improvements in Photographic Lamps.' S. J. LEVI.—*Dated January* 9, 1888.

No. 356.—'Improvements in Apparatus for Producing Flashing Lights for Photographic, Scenic, and Signal Purposes, in which Magnesium, Lycopodium, and other Highly Combustible Powders are Employed Singly or in Combination for White or Coloured Flashes.' F. W. HART and W. BISHOP.—*Dated January* 9, 1888.

No. 423.—'Improvements in the Method of and Apparatus for Producing Animated Photographic Pictures.' L. A. A. LE PRINCE.—*Dated January* 10, 1888.

No. 450.—'An Improved Glass for Photograph Frames.' W. D. WILKINSON, F. FOWLER, and C. LEA.—*Dated January* 11, 1888.

SEE PAGES 678 and 679.

No. 524.—'Improvements in Photographic Printing.' E. H. FARMER.—*Dated January* 12, 1888.

No. 582.—'An Improved Lamp or Apparatus for Use in Photographing by Artificial Light.' T. H. REDWOOD.—*Dated January* 13, 1888.

No. 614.—'Improvements in Camera Dark Slides for Photographic Purposes.' J. BROWN.—*Dated January* 14, 1888.

No. 907.—'Improvements in Camera Stands.' F. BARR.—*Dated January* 20, 1888.

No. 949.—'Flash Lights and Apparatus connected therewith for Photographic and other Purposes.' J. E. THORNTON.—*Dated January* 21, 1888.

No. 982.—'Improvements in Photographic Lenses.' T. R. DALLMEYER.—*Dated January* 21, 1888.

No. 1026.—'Improvements in or relating to the Production of Pictures or Images on Materials or Fabrics having a Dark Ground by a Photo-mechanical Process.' Communicated by J. W. C. C. Schirm. W. P. THOMPSON.—*Dated January* 23, 1888.

No. 1133.—'Improvements in Photographic Shutters.' J. C. ASTEN.—*Dated January* 25, 1888.

No. 1201.—'Improved Photographic Plate to be Developed in Water.' Communicated by L. Backelandt. Complete specification. A. J. BOULT.—*Dated January* 26, 1888.

No. 1359.—'Improvements in Photographic Cameras.' J. E. THORNTON.—*Dated January* 30, 1888.

No. 1583.—'Improvements in Photographic Lenses.' T. R. DALLMEYER.—*Dated February* 2, 1888.

No. 1635.—'Improvements in or connected with Projecting Lanterns, Reflecting Surfaces, and Timepieces.' Communicated by M. Pincoffs and A. Korolànyi. F. CRANE.—*Dated February* 3, 1888.

No. 1642.—'An Improved Device for Carrying Photographic Apparatus on Velocipedes.' C. M. LINLEY and J. BIGGS.—*Dated Februarg* 3, 1888.

No. 1960.—'An Improved Stand for Photographs.' B. MCEVOY.—*Dated February* 9, 1888.

No. 1985.—'Improvements in Woodburytype Printing.' G. C. WHITFIELD.—*Dated February* 9, 1888.

Enlargements.

No. 2207.—'Improvements in Lighting Apparatus for Magic Lanterns. L. PERKEN.—*Dated February* 14, 1888.

No. 2360.—'Improvements in Exposure Shutters for Photographic Purposes.' W. MCELROY and T. P. WATSON.—*Dated February* 16, 1888.

No. 2382.—'Improvements in Photographic Cameras.' E. PHIPPS.—*Dated February* 17, 1888.

No. 2417.—'Improvements in Albums for Photographs and the like.' C. WELLS and R. STOAKES.—*Dated February* 17, 1888.

No. 2474.—'Working a Photographic Shutter by means of a Pneumatic Piston to be known as the "Blackbee Pneumatic Shutter."' F. D. BLACKBEE.—*Dated February* 20, 1888.

No. 2730.—'Improvements in Lamps for the Rapid Combustion of Magnesium Powder for Photographic Purposes.' A. JAMES.—*Dated February* 23, 1888.

No. 2751.—'An Improved Method of Producing Photographic Vignettes.' M. H. P. R. SANKEY.—*Dated February* 24, 1888.

No. 2798.—'Improvements in and connected with Diaphragms and Shutters for Photographic and other Lenses or Cameras.' J. M. ELLIOT.—*Dated February* 24, 1888.

No. 2975.—'New or Improved Arrangements or Devices or Articles of Furniture for Exhibiting and Holding Photographs, Cards, Pictures, and the like.' H. HEAPE.—*Dated February* 28, 1888.

No. 3009.—'Improvements connected with Photographic Cameras.' J. R. GOTZ.—*Dated February* 28, 1888.

No. 3076.—'An Improved Camera.' C. H. GALE.—*Dated February* 29, 1888.

No. 3103.—'Improved Illuminating Apparatus for Artificial Light Photography.' C. NEVE and F. BISHOP.—*Dated February* 29, 1888.

No. 3114.—'Improvements in Frames or Stands for holding Photographic and other Pictures, Tablets, and the like.' J. CADBURY and W. H. RICHARDS.—*Dated March* 1, 1888.

No. 3177.—'Improvements in Levels for Photographic Cameras.' W. R. WYNNE.—*Dated March* 2, 1888.

SEE PAGE 681.

No. 3196.—'Improvements in Tripod Stands for Photographic Surveying and other Purposes.' J. W. RAMSDEN.—*Dated March* 2, 1888.

No. 3259.—'Improvements in Photographic Shutters.' Complete specification. J. PLACE.—*Dated March* 3, 1888.

No. 3329.— An Improved Lens.' J. WALSH.—*Dated March* 5, 1888.

No. 3352.—'A New and Combined Apparatus or Desk for Retouching Photographs.' E. J. PASSINGHAM.—*Dated March* 5, 1888.

No. 3424.—'Improvements in Photographic Apparatus.' A. H. BATEMAN.—*Dated March* 6, 1888.

No. 3615.—'A Slide-rule for Photographic Purposes.' SIR D. L. SALOMONS.—*Dated March* 8, 1888.

No. 3620.—'An Improved View Finder and View Meter combined for Photographic Purposes." J. B. ROBINSON.—*Dated March* 9, 1888.

No. 3658.—'Improvements in producing Coloured Photographs.' J. WATSON.—*Dated March* 9, 1888.

No. 3779.—'A "Camera Gun" for using with any description of Camera for Instantaneous Photographs.' J. L. BERRY.—*Dated March* 12, 1888.

No. 3782.—'Improvements in Stands or Tables for holding Photographic Cameras, also applicable for holding Music, Newspapers, or similar objects.' F. TAYLOR.—*Dated March* 12, 1888.

No. 3880.—'Improvements in Apparatus for the Obtainment of Oxygen and Nitrogen Gases from Atmospheric Air.' E. B. ELLICE-CLARK and L. CHAPMAN.—*Dated March* 13, 1888.

No. 3941.— Improvements in Photographic Shutters.' S. DELICATE.—*Dated March* 14, 1888.

No. 3967—'An Apparatus for the Extraction of Oxygen and Nitrogen from the Atmospheric Air.' A. BRIN.—*Dated March* 14, 1888.

No. 4002.—'A Dissolving View and Dioramic Advertising Car.' T. FISHER.—*Dated March* 15, 1888.

No. 4024.—'Improvements in Mounting Photographs and Objects.' E. J. PASSINGHAM.—*Dated March* 15, 1888.

No. 4063.—'Improvements in Plate Racks for Photographic and other similar Purposes.' S. DELICATE.—*Dated March* 16, 1888.

Enlargements.

No. 4112.—'Improvements in Photographic Apparatus.' J. J. L. Guyard. —*Dated March* 16, 1888.

No. 4128.—'A New or Improved Process or Mode and Means of Producing Photographic Prints of Designs for Christmas Cards, Memorial Cards, and other Ornamental Cards of similar nature.' J. Macintosh.—*Dated March* 17, 1888.

No. 4145.—'Improvements in Plate-lifting Apparatus for Working Meta Sheaths under a Bag in connexion with Detective and other Cameras.' S. W Rouch.—*Dated March* 17, 1888.

No. 4149.—'Improvements in Photographic Cameras.' W. A. Brice, Italy. —*Dated March* 17, 1888.

No. 4180.—'Improvements in the Construction of Dark Slides for Photography.' S. Delicate.—*Dated March* 19, 1888.

No. 4248.—'Improving the Form of Camera for obtaining Photographs of Moving and other Objects, which he calls "The Mitrailleuse Camera."' F. Nowlan.—*Dated March* 20, 1888.

No. 4510.—'Photographic Shutters.' J. E. Thornton.—*Dated March* 24, 1888.

No. 4537.—'A Process of Photographing in Colours.' J. B. Germeuil-Bonnaud.—*Dated March* 24, 1888.

No. 4692.—'A New or Improved Photographic Dark Chamber.' A. H. Reed.—*Dated March* 27, 1888.

No. 4823.—'Improvements in Photo-lithography, Photo-engraving, and other Photographic Illustrative Processes.' S. Phillips and A. Stephan.—*Dated March* 29, 1888.

No. 4839.—'Improvements in Apparatus for Holding and Changing the Slide in Magic Lanterns during Exhibition.' C. Goldsmith and J. H. Stafford.—*Dated March* 31, 1888.

No. 4874.—'A Method for Producing Photographic Emulsions not requiring a Base or Support as Photographic Films.' E. S. Williams.—*Dated March* 31, 1888.

No. 5055.—'Improvements in the Production of Dry Plates for Contact Printing in Photography, and using same for Embossing Purposes.' A. Hart.—*Dated April* 5, 1888.

See Page 676.

No. 18,039.—'Improved Apparatus for Taking Positives from Photographic Negatives.' M. H. C. W. FARJASSE.—*Received April* 12, 1888. *Antedated November* 12, 1887.

No. 5140.—'Improvements in the Modes and Means or Apparatus for Taking and Producing Photographs, and in Appliances connected therewith.' J. HINES, E. HOWELL, and A. HOWELL.—*Dated April* 6, 1888.

No. 5189.—'Improvements upon a Photographic Shutter known as "Eclipse" Pneumatic Shutter.' A. I. LICHTENHEIN.—*Dated April* 7, 1888.

No. 5192.—'Improvements in Photographers' Glass Gauge Plates.' H. VANDYCK.—*Dated April* 7, 1888.

No. 5194.—'Improvements in Lenses.' H. L. H. SCHRÖDER and J. STUART.—*Dated April* 7, 1888.

No. 5462.—'An Improved Dark Slide for Photographic Cameras, and Improvements in Cameras to be used therewith.' A. M. HENDERSON.—*Dated April* 12, 1888.

No. 5536.—'Improvements in Roller Dark Slides for Photographic Purposes.' S. J. HOLLIDAY.—*Dated April* 14, 1888.

No. 5545.—'Improvements in Instruments for Calculating Photographic Exposures.' Complete specification. F. HURTER and V. C. DRIFFIELD.—*Dated April* 14, 1888.

No. 5590.—'Improvements in Roller Slides for Holding and Using Photographic Tissue.' R. J. APPLETON.—*Dated April* 16, 1888.

No. 5619.—'Improvements in Photographic Lens Shutters.' T. R. DALLMEYER and F. BEAUCHAMP.—*Dated April* 16, 1888.

No. 5666.—'A Pocket Support for Photographic Cameras.' G. LOWDON.—*Dated April* 17, 1888.

No. 5687.—'Improvements in the Mounting of Photographic Lenses and in Shutters in connexion therewith.' G. L. ADDENBROOKE.—*Dated April* 17, 1888.

No. 5747.—'A Combined Photographic Enlarging Camera and Magic Lantern.' E. MARLOW.—*Dated April* 18, 1888.

No. 5755.—'Measuring the Speed or Time of Exposure of Photographic Instantaneous Shutters.' W. J. WILSON.—*Dated April* 18, 1888.

SEE PAGE 676.

Enlargements.

No. 5763.—'An Automatic Photographic Apparatus.' C. A. RANDALL.—*Dated April* 18, 1888.

No. 5827.—'Improvements in Holders for Photographs and other like Articles.' S. R. WILLIAMS.—*Dated April* 19, 1888.

No. 5869.—'Improvements in Photographic Cameras.' J. HARMER.—*Dated April* 20, 1888.

No. 5974.—'Improvements in Magnesium Lighting Apparatus for Taking Photographic Pictures.' Communicated by J. W. C. C. Schirm. E. EDWARDS.—*Dated April* 21, 1888.

No. 6000.—'Improvements in Photographic Cameras.' C. TOMLINSON.—*Dated April* 23, 1888.

No. 6221.—'Improvements in Photographic Shutters.' M. SHARPE.—*Dated April* 26, 1888.

No. 6275.—'Improvements in Blocks for Holding Zinc Plates for Printing Purposes.' B. OLLENDORFF.—*Dated April* 27, 1888.

No. 6377.—'Improvements in Means for Illuminating Objects for Photographical or similar other Purposes.' T. TURNER.—*Dated April* 30, 1888.

No. 6429.—'An Improved Photographic Dark Room Lamp.' H. LUCAS.—*Dated May* 1, 1888.

No. 6519.—'A Silver or other Metal-backed Hair Brush so constructed as to contain a Photographic Portrait.' J. N. MAPPIN.—*Dated May* 2, 1888.

No. 6583.—'Improvements in and relating to Photographic Shutters.' H. W. TEED.—*Dated May* 3, 1888.

No. 6606.—'Improvements in Photographic Cameras.' S. BAMFORTH and J. HARDMAN.—*Dated May* 3, 1888.

No. 6793.—'Improvements in Photographic Apparatus.' A. F. HERZOG.—*Dated May* 7, 1888.

No. 6814.—'Improvements in and relating to Photographic Apparatus.' S. M. CLARK.—*Dated May* 8, 1888.

No. 6992.—'Improvements in Dark Slides or Plate Holders for Photographic Cameras.' M. TAYLEURE.—*Dated May* 10, 1888.

No. 7039.—'An Apparatus for Enlarging Photographic Negatives.' J. F. FETTER.—*Dated May* 11, 1888.

SEE PAGE 678.

No. 7044.—'Improvements in the Production of Collodion Photographic Films or Surfaces of Exalted Sensitiveness.' R. NORRIS.—*Dated May* 11, 1888.

No. 7049.—'An Improved Camera Stand.' E. MITCHELL.—*Dated May* 11, 1888.

No. 7053.—'Improvements in and relating to Revolving Cases or Albums for Exhibiting Photographic or other Cards or Pictures.' J. WEIR.—*Dated May* 11, 1888.

No. 7067.—'Circulating Stereoscopic Panorama.' Complete specification. A. FUHRMANN.—*Dated May* 12, 1888.

No. 7070.—'An Improved Stereoscope and Method of Lighting the same.' J. DAY.—*Dated May* 12, 1888.

No. 7176.—'Improvements in Combined Diaphragms and Shutters for Photographic and other Lenses.' Communicated by E. Bausch. Complete specification. W. P. THOMPSON.—*Dated May* 15, 1888.

No. 7212.—'An Apparatus for Showing exactly the Position in the Camera of the Object that is to be Photographed." J. F. FETTER.—*Dated May* 15, 1888.

No. 7348.—'Improvements in Magic Lanterns for Enlarging or otherwise and in Apparatus used in connexion therewith.' Complete specification. W. C. HUGHES.—*Dated May* 17, 1888.

No. 7432.—'Improvements in Photographic Cameras.' S. D. MCKELLEN. —*Dated May* 19, 1888.

No. 7486.—'Improved Processes of Obtaining More Brilliant and Permanent Photographs than by the Ordinary Method, and the Means to be Employed in such Processes." J. R. MCKIE.—*Dated May* 22, 1888.

No. 7516.—'Improvement in Obtaining Impressions from Photographs.' J. HICKISSON.—*Dated May* 22, 1888.

No. 7556.—'An Improved Process of Transferring Phototypes to Lithographic Stones.' Complete specification. O. KREBS.—*Dated May* 22, 1888.

No. 7562.—'A Revolving Shutter for Photographic Lenses.' W. H. PRESTWICH.—*Dated May* 23, 1888.

No. 7788.—'Improvements in or relating to Apparatus for Containing, Changing, and Exposing Sensitised Photographic Plates or Films.' T. ROCHE.—*Dated May* 28, 1888.

SEE PAGE 681.

Enlargements.

No. 7942.—'An Improved Photographic "Detective" Camera and Changing Box,' T. KERR.—*Dated May* 31, 1888.

No. 7999.—'An Improved Pneumatic Release for Drop or other Instantaneous Shutters for Photographic Purposes.' A. G. MILES.—*Dated May* 31, 1888.

No. 8166.—'Apparatus for Giving Microscopical and Magic Lantern Object Views, preferably in connexion with a Coin Receiver and with or without a goods distributor.' W. S. SIMPSON.—*Dated June* 4, 1888.

No. 8193.—'Improvements in Photographic Cameras.' H. MADER and F. OERTEL.—*Dated June* 5, 1888.

No. 8242.—'The Improvement of Dark Slides for Dry Plates for Photography.' R. P. STUART.—*Dated June* 6, 1888.

No. 8260.—'Improvements in, or Additions to, Photographic and other Frames and Stands.' J. CADBURY and J. G. ROLLASON.—*Dated June* 6, 1888.

No. 8413.—'Improvements in the Manufacture of Photographic Films.' S. H. FRY.—*Dated June* 8, 1888.

No. 8435.—'Improvements in or relating to Apparatus generally known as "Air Brushes," for Distributing Pigment by means of an Air-blast to Produce Pictures, Landscapes, and other works of Art.' Communicated by C. L. Burdick. Complete specification. W. P. THOMPSON.—*Dated June* 8, 1888.

No. 8447.—'Improvements in Photographic Cameras, part of which is applicable to other Photographic Apparatus.' J. W. TURNER.—*Dated June* 9, 1888.

No. 8471.—'Improvements in Photographic Cameras.' E. PERRETT.—*Dated June* 9, 1888.

No. 8508.—'The Construction of a Lamp to be used for Photographing by Magnesium Light.' W. GUTTENBERG.—*Dated June* 11, 1888.

No. 8518.—'Photographic Stained Glass.' A. E. LETALLE and F. BILLING.—*Dated June* 11, 1888.

No. 8535.—'An Improved Photograph or Picture Holder.' W. H. WARNER.—*Dated June* 11, 1888.

No. 8618.—'Photographic Films.' S. H. FRY.—*Dated June* 12, 1888.

SEE PAGE 674.

No. 8683.—'A Pocket Photograph Apparatus by means of which any Number of Instantaneous or other Views may be taken.' T. N. CROSSE.—*Dated June* 13, 1888.

No. 8739.—'An Improved Instantaneous Shutter for Photographic Purposes.' Complete specification. W. PEAD.—*Dated June* 14, 1888.

No. 8830.—'Improvement in Reversible Holders in Photographic Cameras.' E. HOLMES and W. WATSON.—*Dated June* 16, 1888.

No. 9211.—'An Improved Photographic Exposing Shutter.' S. D. MCKELLEN.—*Dated June* 25, 1888.

No. 9226.—'Improvements in Photographic Developing Dish or Trays.' G. A. DEAN.—*Dated June* 25, 1888.

No. 9244.—'Improved Means of Engraving for Printing and Mezzotinting Purposes either in Intaglio or Relief on Surfaces such as Copper, Steel, Zinc, Stone, or Glass, Pictures, Engravings, or Etchings, or Typographic Printing Blocks generally, which have hitherto been Produced by the Agency of the Graver, Rocking Tools, and Acid, &c.' J. L. MILLS.—*Dated June* 25, 1888.

No. 9327.—'Improvements in Portable Photographic Cameras.' Communicated by E. E. N. Derogy. P. CHARLES.—*Dated June* 26, 1888.

No. 10,197.—'An Improvement in Portable Camera Stands or Tripods.' T. MAYNE.—*Dated July* 13, 1888.

No. 10,441.—'Improvements in Photographic Apparatus for Topographic Purposes.' C. KLIETSCH.—*Dated July* 18, 1888.

No. 10,864.—'An Improved Syphon.' W. H. WARNER.—*Dated July* 27, 1888.

No. 10,865.—'Improvements in the Construction of Supports for Photographic Pictures, Plates, or Films, while under Manipulation.' W. H. WARNER.—*Dated July* 27, 1888.

No. 11,134.—'Improvements in Holders, Clips, or Easels, for Photographs, Mirrors, Photograph Frames, Cards, and other Articles.' H. WHITFIELD.—*Dated August* 1, 1888.

No. 11,142.—'A New Form of Camera Microscope, styled a "Lucernal Camera Microscope and Cosmoramic Lantern."' H. PORTER.—*Dated August* 1, 1888.

No. 11,300.—'An Improved Portable Photographic Camera.' S. G. HARRISON-DEARLE and T. H. ASHCROFT.—*Dated August* 4, 1888.

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Enlargements.

No. 11,309.—'Lens Shutters and Diaphragms.' J. E. THORNTON.—*Date August* 4, 1888.

No. 11,510.—'Improvements in or connected with Photographic Cameras. T. CRAWFORD.—*Dated August* 9, 1888.

No. 11,578.—'Improvements in Photometers for Measuring Intensity of Light in the Photographic Camera.' J. DECOUDUN.—*Dated August* 10, 1888.

No. 11,802.—'Improvements in the Method of, and Apparatus for, Finishing Photographic Prints.' E. J. PASSINGHAM.—*Dated August* 16, 1888.

No. 12,006.—'Improvements in Gas Supply Regulating Apparatus for Magic Lanterns and other Purposes.' J. E. ANDERSON and PERKEN, SON, & RAYMENT. —*Dated August* 20, 1888.

No. 12,086.—'Improvements in Holders, Clips, or Easels, for Photographs, Mirrors, Photograph Frames, Cards, and other Articles.' H. WHITFIELD.—*Dated August* 22, 1888.

No. 12,181.—'Improvements in Shutters for Photographic Cameras.' A. RAYMENT.—*Dated August* 23, 1888.

No. 12,251.—'Improvements in Bottles for Delivering Liquids in Drops.' J. H. MIALL.—*Dated August* 25, 1888.

No. 12,307.—'Photo-lithographic Printing and Transfers by Double Photography.' H. RYDER and W. H. RYDER.—*Dated August* 27, 1888.

No. 12,340.—'Improvements in Frames and Stands for Photographs and other Pictures." C. SCHUBÖ.—*Dated August* 27, 1888.

No. 12,438.—'Improvements in Dark Slides for Photographic Purposes.' F. BEAUCHAMP.—*Dated August* 29, 1888.

No. 12,474.—'An Improved Shutter for Photographic Camera, being an Improvement in Quickness and Regulation of Speed of Exposure, also being Shakeless in Action.' L. HOUSSARD.—*Dated August* 30, 1888.

No. 12,538.—'Improvements in Flexible Photographic Negatives or Pictures and in Apparatus connected therewith.' J. FREEMAN.—*Dated August* 31, 1888.

No. 12,573.—'Improvements in the Construction of Photographic Cameras.' W. SCORER.—*Dated August* 31, 1888.

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No. 12,707.—'An Instantaneous Shutter for Photographic Apparatus.' C. BOUCKAERT.—*Dated September* 3, 1888.

No. 12,915.—'Improvements in and connected with Operating Photographic Apparatus by Coin-liberated Mechanism." T. C. ROUSSEL and A. S. BULL.—*Dated September* 6, 1888.

No. 13,082.—'An Improved Box for Photographic Plates.' F. BARRETT. —*Dated September* 10, 1888.

No. 13,149.—'An Improved Method of Determining the Sensitiveness of Photographic Plates.' J. W. NEWALL.—*Dated September* 12, 1888.

No. 13,267.—'An Improved Machine for use in Bevelling and Gilding the Edges of Photographic and other Cards or Mounts.' Communicated by T. Monchau. F. BISHOP.—*Dated September* 13, 1888.

No. 13,301.—'An Improved Process for the True Reproduction of the Colours of Nature in a Compound Photographic Print.' H. C. BOND.—*Dated September* 14, 1888.

No. 13,315.—'Improvements in Photographic Apparatus.' Communicated by J. J. L. Guyard. B. WILLCOX.—*Dated September* 14, 1888.

No. 13,438.—'Dissolving Fan and Tinter for Optical or Magic Lanterns.' T. H. EDMONDS.—*Dated September* 18, 1888

No. 13,521.—'Improvements in or connected with the Production of Photographic Sensitised Paper, Woven or Tissue Fabrics, Gelatine or Collodion Films, Glass, Porcelain, Metal, Wood, and like Media, for use in the Production of Copies of Photographs, Pictures, Drawings, Designs, Writings, and the like, by the Action of Light.' H. J. SHAWCROSS.—*Dated September* 19, 1888.

No. 13,996.—'Improvements in Portable Photographic Cameras and Appliances relating thereto.' H. WILSON.—*Dated September* 29, 1888.

No. 14,043.—'An Apparatus for Registering the Fronts of a Biunial or Triple Lanterns.' W. C. HUGHES.—*Dated September* 29, 1888.

No. 14,809.—'Improvements in Apparatus for the Exhibition of Photographic Pictures, Advertisements, and the like.' J. T. LEIGHTON.—*Dated October* 1, 1888.

No. 14,171.—'Improvements in Magic Lanterns.' E. T. POTTER.—*Dated October* 2, 1888.

No. 14,218.—'Improvements in Cameras of the Box or Detective Class.' J. B. B. WELLINGTON.—*Dated October* 3, 1888.

No. 14,449.—'Light Excluder or Spring Cut-off for Double Dark Slides.' W. J. SMITH.—*Dated October* 9, 1888.

No. 14,545.—'A New or Improved Construction of Shutter for Photographic Apparatus.' H. HERBERT.—*Dated October* 10, 1888.

No. 14,546.—'Improvements in Apparatus for Changing and Successively Exposing the Plates used in the Process of Photography.' H. HERBERT.—*Dated October* 10, 1888.

No. 14,567.—'Stands or Holders for the Frames of Photographs, Tablets Cards, and such like Articles.' H. RINGWOOD.—*Dated October* 10, 1888.

No. 14,642.—'Improvements in Apparatus for the Production of Oxygen and Nitrogen Gases from Atmospheric Air.' E. B. ELLICE-CLARK and L. CHAPMAN.—*Dated October* 11, 1888.

No. 14,652.—'Improvements in Photographic Cameras.' W. H. R. KERRY. —*Dated October* 12, 1888.

No. 14,696.—'Improvement in the Hinge of Shutters used in Dark Slides for Photographic Purpose.' W. WATSON.—*Dated October* 12, 1888.

No. 14,801.—'Holding or Supporting a Photographic Camera or similar Instrument in combination with an ordinary Walking Stick and Folding Tripod.' G. C. INKPEN.—*Dated October* 15, 1888.

No. 14,851.—'Improvements in Photographic Apparatus.' C. LE ROY and L. GUYARA.—*Dated October* 16, 1888.

No. 15,024.—'Improvements in Apparatus for Washing and Drying Photographic Negatives, Part of such Improvements being applicable also for Washing Photographic Prints.'—J. WOOD.—*Dated October* 19, 1888.

No. 15,068.—'Photographic Appliances.' T. P. GRAHAM.—*Dated October* 19 1888.

No. 15,376.—'An Improved Appliance for Vignetting Photographs.' A. H. GOODALL.—*Dated October* 25, 1888.

No. 15,454.—'Improvements in Photographic Cameras.' S. D. MCKELLEN and J. D. MCKELLEN.—*Dated October* 27, 1888.

No. 15,569.—'Improvements in Changing Boxes for Photographic Plates.' A. D. CAHEN, *dit* CANN.—*Dated October* 29, 1888.

No. 15,723.—'Improvements in Portable Head Rest used in Photography.' Complete specification. W. CROOKE and J. COSTER.—*Dated November* 1, 1888.

No. 15,753.—'An Improved Photographic Shutter.' F. T. BENNETT and A. E. A. WISS.—*Dated November* 1, 1888.

No. 15,901.—'Improvements in, and in the Manufacture of, Photographic Printing Frames.' C. TOMLINSON.—*Dated November* 3, 1888.

No. 15,936.—'A Novel Means or Method of Preparing Photographic and other Pictured Cards or Mounts for connecting them in Book-like Formation, also in Covers for the Purpose.' J. W. ZAEHNSDORF.—*Dated November* 3, 1888.

No. 15,984.—'Improved Means of Producing Copies of Photographic Pictures in Colours.' D. GRANT.—*Dated November* 5, 1888.

No. 16,046.—'Improvements in Adjustable Frames for Holding Magic Lantern Slides and the like.' F. BEAUCHAMP.—*Dated November* 6, 1888.

No. 16,108.—'Improvements in Adapting Balloons for Photographic Purposes.' J. MONTEITH.—*Dated November* 7, 1888.

No. 16,224.—'An Instantaneous Photographic Shutter.' JAMES LYON.—*Dated November* 9, 1888.

No. 16,258.—'An Improvement in the Method of and Materials or Compound employed in developing Photographic Pictures or Images.' WILLIAM OLDHAM.—*Dated November* 9, 1888.

No. 16,537.—'An Improvement in the Method of and Materials or Compound employed in developing Photographic Pictures or Images.' WILLIAM OLDHAM.—*Dated November* 14, 1888.

No. 16,556.—'Improvements in Apparatus to be used in Lanterns for Projection.' HERBERT CHARLES NEWTON.—*Dated November* 14, 1888.

No. 16,575.—'A Corner Piece for Photographic Frames.' WALTER HEATH WELSHMAN.—*Dated November* 15, 1888.

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